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2d Session }

COMMITTEE ON AERONAUTICAL AND SPACE SCIENCES

UNITED STATES SENATE

1958–1976

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COMMITTEE ON AERONAUTICAL AND SPACE SCIENCES

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ADDENDUM

When the 95th Congress convened on January 4, 1977, the Senate Committee on Aeronautical and Space Sciences was organized with Senator Wendell H. Ford, Democrat of Kentucky, as Temporary Chairman. Senators Frank E. Moss, Democrat of Utah, and Stuart Symington, Democrat of Missouri, left the Committee and the Senate at the expiration of their terms on January 3, 1977. No other changes were made in the Committee membership while the Senate considered a Resolution to reorganize its committee system. On February 4, 1977, the Senate passed Senate Resolution 4 to reorganize its committee system. In keeping with the provisions of this Resolution, the Committee on Aeronautical and Space Sciences ceased to exist on February 11, 1977, and its jurisdiction, functions and staff were transferred to the Committee on Commerce, Science and Transportation.

(Addendum to Committee Print entitled "Committee on Aeronautical & Space Sciences, U. S. Senate, 1958-1976)

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PREFACE

This document gives the historical background and record of the Senate Committee of Aeronautical and Space Sciences during the first 18 years of its existence.

The involvement of the U.S. Senate in space affairs began shortly after the first artificial satellite was launched in the fall of 1957. The Preparedness Investigating Subcommittee of the Senate Armed Services Committee began its investigation of the missile and satellite situation in November of that year. The following February the Senate established a Special Committee on Space and Astronautics to deal with the problem of how the United States could become the leader in space and aeronautics. The Senate established the standing Committee on Aeronautical and Space Sciences on July 24, 1958, and the National Aeronautics and Space Act, the basic law of the U.S. space program, was enacted five days later.

Using this basic law, we have made great progress in the succeeding 18 years. The U.S. continues today to be pre-eminent in space, but we forget that 15–18 years ago our place in space was very much in doubt. The Soviet Union was the first to launch a satellite and the first to place a man in orbit. But the U.S.S.R.'s lead has evaporated in the face of a series of United States successes in space. We have landed men on the moon six times and flown men in earth orbit for a record 84 days. The Apollo and Skylab missions returned a cornucopia of scientific information.

Progress in the unmanned exploration of space has been just as successful. The successful landing of two Viking spacecraft on Mars this past summer is the latest in a series of missions that has added greatly to our knowledge of Mercury, Venus, Mars and Jupiter. The application satellites have vastly improved our lives here on Earth through improvements in communications, weather forecasting and earth resources information.

At the same time, the U.S. was also fostering international cooperation so that all nations could share in the benefits of space. Several treaties have been negotiated under the auspices of the United Nations to ensure that space remains peaceful. International cooperation in space will continue to grow with the advent of the reusable Space Shuttle, which the U.S. is now developing. Unlike current rockets, the Space Shuttle is designed to make many space flights with only minor servicing between missions. It will give us routine access to the unique environment of space and reduce the cost of our space flights. One of the principal missions of the Space Shuttle will be the Spacelab, which is being developed by the European Space Agency. Spacelab will enable scientists to perform their experiments in a shirtsleeve atmosphere for up to 30 days in space.

The Committee is publishing this brief history in response to many requests for information about its activities. I hope this document will help develop an appreciation for our rich legacy in space and prepare for more fruitful use of space in the future.

Senator Frank E. Moss,
Chairman.

December, 1976

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COMMITTEE ON AERONAUTICAL AND SPACE SCIENCES

I. CHAIRMEN OF THE COMMITTEE

LYNDON B. JOHNSON

Lyndon B. Johnson was born near Johnson City, Texas, on August 27, 1908. He graduated from Southwest Texas State Teachers College in 1930 and then taught in the public schools in Houston for two years.

He first came to Washington as secretary to Congressman Richard M. Kleberg of Texas. After three years in that position, he was Texas State Director of the National Youth Administration from 1935 until he won a special election to fill a vacancy in the House of Representatives. He was reelected five times to the House before being elected to the Senate in 1948. He was reelected in 1954 and 1960.

He was Senate Minority Leader in 1953 and 1954 and Majority Leader from 1955 to 1961. Under the leadership of Senator Johnson, the Preparedness Investigating Subcommittee of the Armed Services Committee held extensive hearings on the missile and satellite programs of the U.S. and the Soviet Union following launch of the first artificial satellite in October, 1957. These hearings led to an improved and larger U.S. space program. Senator Johnson was instrumental in forming and then became chairman of the Special Committee on Space and Astronautics and its successor, the permanent Committee on Aeronautical and Space Sciences. He also participated in drafting and securing passage of the National Aeronautics and Space Act of 1958, which established the National Aeronautics and Space Administration.

Following his election as Vice President in November, 1960, he continued to play an active role in the U.S. space program as chairman of the National Aeronautics and Space Council. He continued his active support of the U.S. space program while President of the United States from November, 1963 to January, 1969. During that time, the groundwork was laid for the first successful landing of men on the moon in July, 1969. After leaving the White House, President Johnson returned to his ranch in Texas, where he died on January 22, 1973. The next month Congress passed and the President signed into law a resolution changing the name of the Manned Spacecraft Center in Houston, Texas to the Lyndon B. Johnson Space Center in honor of the late President.

ROBERT S. KERR

Robert S. Kerr was born in Ada, Oklahoma, on September 11, 1896. He attended Oklahoma Baptist University during 1911 and 1912 and Oklahoma University in 1915 and 1916. From 1917 to 1919 he served as a Second Lieutenant in the United States Army; and later as a Captain and a Major in the Oklahoma National Guard from 1921 to 1929. He went into law practice in Ada in 1922, after having been admitted to the Oklahoma Bar.

He also went into business as a drilling contractor and oil producer in 1926 and eventually became Chairman of the Board of Kerr-McGee Industries, Inc. He served as a special justice of the Oklahoma Supreme Court in 1931, as President of the Oklahoma County Juvenile Council in 1935 and 1936, and as a member of the Unofficial Pardon and Parole Board from 1935 to 1938.

From 1943 to 1947 he was Governor of Oklahoma and was chosen to serve as Chairman of the Southern Governors' Conference in 1945 and 1946. From 1940 to 1948 he was a Democratic national committeeman. He was elected to the United States Senate in 1948, in 1954, and in 1960. (Democrat, Oklahoma.)

During his tenure in the Senate, he served as Chairman of the Select Committee on National Water Resources from 1959 to 1961, and as Chairman of the Committee on Aeronautical and Space Sciences from January 10, 1961, until his death on January 1, 1963.

Under his chairmanship, the Apollo program to land a man on the moon and return him safely to earth was accepted as a national goal. He also played an important role in the legislation which established the Communications Satellite Corporation.

CLINTON P. ANDERSON

Clinton P. Anderson was born in Centerville, South Dakota, on October 23, 1895. He attended Dakota Wesleyan University and the University of Michigan. In 1917 he moved to Albuquerque, New Mexico, where he worked as a newspaper reporter and editor from 1918 to 1922, and where he engaged in the general insurance business from 1922 to 1946. From 1932 to 1933 he was President of Rotary International. During 1933 and 1934 he served as Treasurer of the State of New Mexico. He became administrator of the New Mexico Relief Administration in 1935, and thereafter served as field representative of the Federal Emergency Relief Administration in 1935 and 1936. From 1936 to 1938 he held the posts of Chairman and Executive Director of the Unemployment Compensation Commission of New Mexico, and was Managing Director of the United States Coronado Exposition Commission from 1939 to 1940.

He was elected to the House of Representatives in the 77th, 78th, and 79th Congress (Democrat, New Mexico). He served in the House from January 3, 1941, until July 30, 1945, when he resigned to accept appointment as Secretary of Agriculture, a post he held until his resignation on May 10, 1948.

He was elected to the United States Senate on November 2, 1948, and was reelected in 1954, 1960, and 1966. There he served as Chairman of the Democratic Senatorial Campaign Committee from 1949 to 1951; as Chairman of the Joint Committee on Atomic Energy from 1955 to 1957, and again from 1959 to 1961; and as Chairman of the Interior and Insular Affairs Committee from 1961 to 1963. He was chairman of the Committee on Aeronautical and Space Sciences from February 25, 1963 until January 4, 1973, when he retired from the Senate. Senator Anderson died in New Mexico on November 11, 1975.

FRANK E. MOSS

Frank E. Moss was born in Holladay, Utah on September 23, 1911. He graduated magna cum laude from the University of Utah in 1933 and cum laude from the George Washington University Law School in 1937. He was an attorney with the Securities and Exchange Commission in Washington, D.C. from 1937 to 1939. Returning to Utah, he was elected a Salt Lake City judge in 1940. During World War II he served four years in the European Theater as a judge advocate in the U.S. Army Air Corps. After the war, he was reelected a judge in 1945 and then elected Salt Lake County attorney in 1950. He was reelected four years later.

Senator Moss was elected to the Senate on November 4, 1958 and reelected in 1964 and 1970. He became chairman of the Committee on Aeronautical and Space Sciences on January 4, 1973. In the 94th Congress, he also was secretary of the Democratic Conference in the Senate and chairman of three subcommittees on other Committees.

During his tenure as chairman, Senator Moss was instrumental in obtaining authorization for the third Landsat earth resources satellite, which is due to be launched in late 1977. He also sponsored legislation that would establish an operational Landsat system as the successor to the current experimental one. He was a principal supporter of legislation directing NASA to undertake a program of research in the upper atmosphere in order to understand the problem of ozone depletion. Senator Moss also was a sponsor of legislation to establish the post of science adviser to the President and played a key role in securing its passage by Congress. It was at his instigation that NASA formulated a detailed program to develop technology for more fuel efficient aircraft.

II. HISTORICAL BACKGROUND

II. HISTORICAL BACKGROUND

1. THE BEGINNING OF THE SPACE AGE

The world was astonished by the dramatic event of the Soviet Union being the first nation to launch an earth satellite on October 4, 1957. Within a month, on November 3, 1957, a second and much larger Sputnik containing the dog "Laika" was sent into orbit. Each of these Soviet satellites had a total payload weight in orbit of almost 4 tons, a striking contrast to the initial U.S. planning for a Vanguard satellite of only 3.25 pounds.

Tremendous surprise greeted this evidence of the high level of Soviet science and technology. Aside from the psychological effect upon world public opinion, the space accomplishments of the Soviet Union had grave implications for the security of the free world. The U.S.S.R. had demonstrated in its satellite program its capacity for launching intercontinental ballistic missiles, and its intention of exploring a new environment whose control could affect methods of maintaining peace and waging war.

2. SATELLITE AND MISSILE HEARINGS OF THE PREPAREDNESS INVESTIGATING SUBCOMMITTEE OF THE SENATE ARMED SERVICES COMMITTEE

The relationship between satellites and national defense accounts for the urgency of the first legislative investigation of the space age. The Preparedness Investigating Subcommittee of the Senate Armed Services Committee, under the chairmanship of Senator Lyndon B. Johnson, moved swiftly to start hearings on November 25, 1957. The "Inquiry Into Satellite and Missile Programs" continued through the rest of that year and into 1958. By January 23, 1958, the subcommittee was in a position to review testimony it had received from leaders in Government, science, education, and industry, and to reach conclusions concerning existing and future defense. Although concluding that the satellite was not yet a weapon, the subcommittee reported that the Soviet Union had led the world into outer space, and that it would be necessary for the United States to put forth a tremendous effort to insure its own preeminence in defense and space. The subcommittee was well aware that its jurisdictional responsibilities were limited to defense, but pointed out the necessity of others exploring whatever needed to be done to involve the total effort of the Nation. The subcommittee agreed that "* * * the same forces, the same knowledge, and the same technology which are producing ballistic missiles can also produce instruments of peace and universal cooperation." [1]

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[1] Inquiry Into Satellite and Missile Programs. Hearings before the Preparedness Investigating Subcommittee of the Senate Committee on Armed Services, 85th Cong., first and second sessions, part 3, 1958, p. 2429.

The hearings had the immediate effect of accelerating activity in the Department of Defense to strengthen the U.S. space program. The Congress passed interim measures which were necessary pending the deliberations of the Senate and House on the future organization of the Government for the conduct of space activities. Public Law 85–325 (72 Stat. 11), approved on February 12, 1958, contained a section authorizing the Secretary of Defense to engage in advanced research projects, and for a period of 1 year to be responsible for space projects as designated by the President. Public Law 85–322 (72 Stat. 6), enacted on February 11, 1958, made a supplemental defense appropriation for fiscal 1958 providing $10 million in transfer authority for advanced research. The Advanced Research Projects Agency (ARPA) was established in the Department of Defense on February 7, 1958. At that time, witnesses before the Preparedness Subcommittee testified that between 75 and 90 percent of the existing U.S. space program was located in the Department of Defense. The hearings of the Senate Preparedness Investigating Subcommittee revealed that a total U.S. space program would require civilian as well as military space research, development, and applications. The main issue which emerged for legislative consideration was whether space activities should be developed by a new civilian agency rather than remain primarily in the Department of Defense.

3. CREATION OF THE SENATE SPECIAL COMMITTEE ON SPACE AND ASTRONAUTICS

The Senate established the Special Committee on Space and Astronautics by passing Senate Resolution 256 on February 6, 1958, directing it to study and investigate all aspects of space exploration, including "the control, development, and use of astronautical resources, personnel, equipment, and facilities," and report its recommendations to the Senate by June 1, 1958, but not later than January 31, 1959.

The resolution provided for 13 members, seven from the majority party and six from the minority, to be appointed by the Vice President from the Committees on Appropriations, Foreign Relations, Armed Services, Interstate and Foreign Commerce, Government Operations, and the Joint Committee on Atomic Energy. The selection of the membership revealed the fact that the subject of space exploration created some puzzling problems of committee organization and jurisdiction for the Congress. When the comprehensive nature of space activities was revealed in the hearings held by the Senate Preparedness Investigating Subcommittee, it became evident that the subject matter of component parts of a U.S. space program cut across the jurisdictional lines of several standing committees of the Senate. A different combination of the substantive committees could be involved with each piece of space legislation, in addition to the regular processes of the Committees on Appropriations.

The complicated parliamentary situation which might arise in the referral of bills to the committees was recognized and became a factor in the selection of the Senators appointed to the Special Committee on Space and Astronautics. For the most part, the special committee was composed of the chairmen and ranking minority members of the standing committees which had a logical interest in space exploration.

It should be noted, also, that five members of the Senate Armed Services Committee, who had already participated in the work of the Preparedness Investigating Subcommittee in its missile-satellite investigation, were chosen for membership on the new space committee. Under the terms of its resolution, the newly created Special Committee on Space and Astronautics was able to use the professional staff services of the Preparedness Subcommittee as well as those of other committees and subcommittees.[1] Thus the expense of recruiting a large staff for the temporary life of the special committee was avoided. The importance attached to space activities was indicated by the election, as committee chairman, of the majority leader of the Senate, Lyndon B. Johnson.

The bill drafted to include the President's proposals in his message to Congress on Space Science and Exploration, April 2, 1958, was introduced in the Senate as S. 3609 by Senator Lyndon B. Johnson for himself and Senator Styles Bridges, by request, on April 14, 1958. The bill was referred to the new special committee which held hearings during May 1958 to determine what decisions should be reached with regard to the organization of the Government for conducting an outstanding U.S. aeronautical and space program. No difference of opinion developed among committee members over three of the main proposals: that a civilian space agency should be established; that the National Advisory Committee for Aeronautics (NACA) should be the nucleus of the new agency; and that the Department of Defense should be responsible for space programs essential to national defense.

Implicit in the original draft legislation, however, there was a different assumption concerning the nature of the problem to be solved from that which was in the law as finally passed by the Congress. And in several major respects, the differences between the original proposals for space legislation and the law as enacted represent contributions made by the Senate Special Committee on Space and Astronautics. The assumption underlying the original version of S. 3609 was that a total U.S. space program could result from dividing projects between agencies, declaring that they should voluntarily cooperate, and making no provision for overall coordination. The impression was given that the Director of the new space agency would have considerable authority over the U.S. civilian space program because he was being given an advisory rather than an executive board within his own organization, and he would not have to share authority and responsibility with others as in a commission-type structure. The Director was to have only permissive authority to transfer projects from other agencies with the concurrence of their directors and the approval of the President for a period of 3 years. It was not clear how the overlap between the new civilian agency—which eventually became the National Aeronautics and Space Administration (NASA)—and the Department of Defense would be handled, nor how other agencies with space-related programs would be coordinated; for example, the Atomic Energy Commission, the Department of State, the Department of Commerce, and others. Since the function of coordination requires some organizational arrangement for centralized guidance, the version of S. 3609 which passed the Senate contained a provision for a National Aeronautics and Space Policy Board over which the President would preside. During the conference on the different space bills which passed the Senate and House, the Senate concept that interagency coordination should be at a high level led to final agreement on the National Aeronautics and Space Council.

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[1] The only full-time staff of the Special Committee on Space and Astronautics consisted of Dr. Glen P. Wilson, coordinator of technical information; Eilene Galloway, special consultant; and Mary Rita Guilfoyle Robbins, assistant clerk. The de facto staff director was Gerald W. Siegel, counsel, Democratic policy committee. Principal among others who gave assistance were Edwin L. Weisl, consulting counsel; Cyrus Vance, consulting counsel; Dr. Edward C. Welsh, legislative assistant to Senator Stuart Symington; David B. H. Martin, legislative assistant to Senator Leverett Saltonstall; Solis Horwitz, counsel, Senate Preparedness Investigating Subcommittee; and John C. Herberg, senior counsel, Office of the Legislative Counsel.

The relationship between NASA and the Department of Defense was more clearly defined by the Senate committee. Certain functions were transferred from the Department of Defense to NASA which was given authority "to plan, direct, and conduct aeronautical and space activities" except those primarily concerned with defense. The Department of Defense was given responsibility over "activities peculiar to or primarily associated with the development of weapons systems." Both agencies were given authority to engage in research and development in this area.

Another contribution of the Senate special committee to the National Aeronautics and Space Act of 1958 was that of establishing the need for a section in the law providing for international cooperation. In the declaration of policy and purpose, the original bill defined one of its objectives as "cooperation by the United States with other nations and groups of nations in work done pursuant to this act and in the peaceful application of the results thereof," but there was no subsequent implementing section in the bill. Section 205 on "International Cooperation" was written into the bill which passed the Senate and became part of the NASA act authorizing the new agency to engage in a program of international space cooperation under the foreign policy guidance of the President.

On June 2, 1958, the House passed the bill providing for the establishment of NASA. The Senate took action on June 16, and on July 16 the conference report was agreed to both in the House and Senate by voice vote. On July 29, 1958, the President approved the action and the National Aeronautics and Space Act of 1958 became Public Law 85–568 (72 Stat. 426). In signing the bill, the President stated that he understood section 205 on international cooperation as not precluding less formal arrangements than treaties which require the advice and consent of the Senate.

This early history reveals that the significance of space exploration for the Nation and the world was immediately recognized at the beginning of the space age. The Senate studied in depth the problem of organizing the Government so that the United States would become preeminent in developing the uses of the space environment. The task was delegated to Senators who were already on committees which might be expected to have developed expertise in subjects closely related to space matters. Pending a decision on the creation of a permanent committee, no time was lost. Existing committees and their professional staffs were used to analyze and report on questions involved in legislation containing guiding principles for the future conduct of the U.S. space program.

These principles became the basis for the long-range policies which govern the development of the U.S. space program and its supporting budget. Congress declared that space activities should be devoted to peaceful purposes for the benefit of all mankind, and directed that they should be conducted so as to contribute materially to the expansion of human knowledge; the improvement of aeronautical and space vehicles, including the operation of those capable of carrying instruments and living organisms through space; the study of potential benefits to be derived from peaceful and scientific purposes; the preservation of the United States as a leader in aeronautical and space activities; the exchange of necessary information between military and civilian agencies and the avoidance of unnecessary duplication; and cooperation by the United States with other nations and groups of nations in the peaceful application of space science and technology.

The future organization of Congress for handling legislative space matters was a task for internal consideration rather than one whose solution could reasonably be sought through the process of public hearings. The Senate special committee analyzed the advantages and disadvantages of four alternative methods of committee organization and jurisdiction: (1) separate standing committees in the Senate and House; (2) division of jurisdiction among existing standing committees; (3) assignment of jurisdiction to the Joint Committee on Atomic Energy; and (4) creation of a Joint Committee on Aeronautics and Space.

At one point in the legislative history, there was a strong probability that provision for a Joint Committee on Aeronautics and Space would be included in the bill whose provisions were enacted into law. In reporting the legislation to the House on the creation of the National Aeronautics and Space Administration, the House Select Committee on Astronautics and Space Exploration recommended a joint congressional committee. The idea was abandoned by the House, however, in favor of amending its rules to provide for a separate Committee on Science and Astronautics.

The Senate version of the space legislation provided for a Joint Committee on Aeronautics and Space, but when the matter was considered by the conference committee the Senate conferees acceded to the expressed preference of the House for a separate standing committee.

In view of this action, it became necessary for the Senate to reconsider how it intended to handle space matters on a permanent basis.

III. SENATE COMMITTEE ON AERONAUTICAL AND SPACE SCIENCES

III. SENATE COMMITTEE ON AERONAUTICAL AND SPACE SCIENCES

1. ESTABLISHMENT AND JURISDICTION

On July 15, 1958, Senator Lyndon B. Johnson introduced Senate Resolution 327 to create a standing Senate Committee on Aeronautical and Space Sciences. Following favorable action by the Rules Committee, the Senate passed the resolution on July 24, 1958. Most of the Senators who had served on the special committee became members of the new standing committee, and Senator Lyndon B. Johnson became chairman. The Committee on Aeronautical and Space Sciences did not meet during the remainder of 1958 and space matters continued to be handled by the special committee whose existence was extended until March 11, 1959, when its final report was filed.*

The new Senate committee was given jurisdiction over the National Aeronautics and Space Administration and made responsible for aeronautical and space sciences, except those primarily concerned with the development of weapons systems or military operations which are reserved to the Senate Armed Services Committee. The Senate Space Committee was given authority, however, to survey and report on both the military and civilian space activities of all agencies of the United States.

The Standing Rules of the Senate define the committee's jurisdiction as follows:

RULE XXV [1]

STANDING COMMITTEES

1. The following standing committees shall be appointed at the commencement of each Congress, with leave to report by bill or otherwise:

(a)[2] (1) **Committee on Aeronautical and Space Sciences,** to consist of sixteen [3] Senators, to which committee shall be referred all proposed legislation, messages, petitions, memorials, and other matters relating primarily to the following subjects:

(A) Aeronautical and space activities, as that term is defined in the National Aeronautics and Space Act of 1958, except those which are peculiar to or primarily associated with the development of weapons systems or military operations.

(B) Matters relating generally to the scientific aspects of such aeronautical and space activities, except those which are peculiar to or primarily associated with the development of weapons systems or military operations.

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*Final Report of the Senate Special Committee on Space and Astronautics, pursuant to S. Res. 256, 85th Congress, S. Rept. No. 100, 86th Cong., first sess. Mar. 11, 1959, 76 p.

[1] Rule XXV amended in entirety S. Jour. 157–160, 88–1, Feb. 25, 1963. (For rule XXV as effective Jan. 2, 1947, see S. Jour. 229, 79–2, June 10, 1946.)

[2] As amended, S. Jour. 508, 85–2, July 24, 1958.

[3] The number has varied over the years, currently it is ten.

(C) National Aeronautics and Space Administration.

(2) Such committee also shall have jurisdiction to survey and review, and to prepare studies and reports upon, aeronautical and space activities of all agencies of the United States, including such activities which are peculiar to or primarily associated with the development of weapons systems or military operations.

* * * * * * *

4.[4] Each Senator shall serve on two and no more of the following standing committees: Committee on Aeronautical and Space Sciences; Committee on Agriculture and Forestry; Committee on Appropriations; Committee on Armed Services; Committee on Banking and Currency; Committee on Commerce; Committee on Finance; Committee on Foreign Relations; Committee on Government Operations; Committee on Interior and Insular Affairs; Committee on the Judiciary; Committee on Labor and Public Welfare; and the Committee on Public Works: *Provided, however*, That those Senators who, as of January 9, 1963, were members of the Committee on Aeronautical and Space Sciences or the Committee on Government Operations, as well as any Senator who is appointed temporarily to fill any vacancy arising out of this proviso, shall be entitled to serve on three of the foregoing standing committees. No Senator shall serve on more than one of the following standing committees: Committee on the District of Columbia; Committee on Post Office and Civil Service; and the Committee on Rules and Administration. The foregoing provisions of this paragraph shall not be effective during any period when there are more than forty-seven [5] Senators of the minority party.

The committee's jurisdiction is also governed by section 136 of the Legislative Reorganization Act of 1946 (60 Stat. 812) which applies to all standing committees:

> To assist the Congress in appraising the administration of the laws and in developing such amendments or related legislation as it may deem necessary, each standing committee of the Senate and the House of Representatives shall exercise continuous watchfulness of the execution by the administrative agencies concerned of any laws, the subject matter of which is within the jurisdiction of such committee; and, for that purpose, shall study all pertinent reports and data submitted to the Congress by the agencies in the executive branch of the Government.

The membership of the committee was selected and approved by the Senate on the last day of the second session of the 85th Congress, August 24, 1958. Meanwhile, as a result of the election in November 1958, there was a substantial gain in the number of Democrats in the Senate and the ratio of majority to minority party members on the Committee on Aeronautical and Space Sciences was changed from

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[4] As amended, S. Jour. 157–160, 88–1, Feb. 25, 1963. For prior amendments to this section, now superseded, see S. Jour. 56–57, 83–1, Jan. 9, 1953; S. Jour. 24, 84–1, Jan. 6, 1955; S. Jour. 33, 84–1, Jan. 10, 1955; S. Jour. 41, 85–1, Jan. 9, 1957; S. Jour. 509, 85–2, July 24, 1958; S. Jour 42, 86–1, Jan 14, 1959.

[5] As amended, S. Jour. 726, 86–1, Sept. 12, 1959.

8 to 7 to 10 to 5. Permanent staff members were appointed, and the new standing committee began operating at the beginning of the first session of the 86th Congress in January 1959.

2. COMMITTEE RECORD

86TH CONGRESS, FIRST SESSION, 1959

(JANUARY 7, 1959, TO SEPTEMBER 15, 1959)

The Senate Committee on Aeronautical and Space Sciences handled the preponderance of its work in 1959 through two subcommittees: the NASA Authorization Subcommittee and the Subcommitte on Governmental Organization for Space Activities. It will be recalled that the chairman, Senator Lyndon B. Johnson, was also majority leader of the Senate and chairman of the Preparedness Investigating Subcommittee of the Senate Armed Services Committee.

The Senate Space Committee's 15 members (10 Democrats and five Republicans) reflected the ratio of party members in the new Congress. Six were chosen to serve on the NASA Authorization Subcommittee:

JOHN STENNIS, Mississippi, *Chairman*

STEPHEN M. YOUNG, Ohio	MARGARET CHASE SMITH, Maine
THOMAS J. DODD, Connecticut	THOS. E. MARTIN, Iowa
HOWARD W. CANNON, Nevada	

The first hearings of this subcommittee began on February 19, 1959, on S. 1096, a bill to authorize supplemental appropriations to the National Aeronautics and Space Administration for salaries and expenses, research and development, construction and equipment for fiscal year 1959. A temporary provision had been included in the appropriations act of August 27, 1958 (Public Law 85–766, 72 Stat. 873) stating that—

> No appropriation may be made to the National Aeronautics and Space Administration for any period prior to June 30, 1960, unless previously authorized by legislation hereafter enacted by the Congress.

The purpose of this stipulation was to insure very careful consideration of the agency's budget and full presentation by NASA of its plans and programs to the newly created standing committees of the Senate and House. It should be noted that this requirement for prior authorization was made permanent by section 4 of Public Law 86–45, June 15, 1959 (73 Stat. 75, 42 U.S.C. 2460) which provides that—

> Notwithstanding the provisions of any other law, no appropriation may be made to the National Aeronautics and Space Administration unless previously authorized by legislation hereafter enacted by the Congress.

Harmony between policy, program, and budget was sought so that the United States could achieve outstanding success in its space activities. Following the budget hearings, Senator Stennis reported favorably for the full committee, on March 5, 1959, a supplemental authorization of $48,354,000 for NASA's salaries and expenses, research and development, construction and equipment. Altogether $490,300,000 was authorized and $485,075,000 was appropriated for fiscal year 1960.

The subcommittee then turned its attention to an amendment to the NASA Act authorizing the lease of buildings in the District of Columbia. The authorization for a period not to exceed 10 years was given in Public Law 86–20 (73 Stat. 21), May 13, 1959. All such actions were part of the legislative process which was expedited to pass every measure which would contribute to an efficient and orderly transition from the old agency, the National Advisory Committee on Aeronautics, to the new National Aeronautics and Space Administration.

By April 7, 1959, the subcommittee was in a position to begin its major task of holding hearings on NASA's authorization for fiscal year 1960. The method used by the subcommittee proved a unique contribution to the legislative process. Decisions had to be made by lawmakers in a field which was almost entirely new, creating the problem of the most effective way of relating public policy to space science and technology. Part I of the hearings dealt with "Scientific and Technical Presentations" while part 2 analyzed the "Program Detail for Fiscal Year 1960." Experts on space science and technology briefed the members on all the factors involved in space activities, using color slides, movies, and charts to explain programs and costs. This practice of graphic presentation with explanation by individuals, and occasionally by panels of experts, was continued in subsequent years. Members and staff developed the type of expertise required for relating technical subjects to the legislative process. This type of illustrated information was reproduced in the published hearings and often used as up-to-date texts for schools and colleges.

On January 29 and 30, 1959, the Senate Committee on Aeronautical and Space Sciences held joint hearings with the Preparedness Investigating Subcommittee of the Committee on Armed Services to investigate the missile and space activities of the United States. The chairman, Senator Lyndon B. Johnson, pointed out that a year had passed since a series of hearings had been held on the satellite/missile situation and that the purpose of the new hearings was to review the progress that had been made on the unanimous recommendations made to accelerate preparedness for defense and exploration of outer space. The Secretary of Defense, Joint Chiefs of Staff, and other officials in the Department of Defense were called upon to testify concerning their programs. The Administrator and other top officials of NASA also explained the status of their space efforts. This check by the committee on the rate and degree of accomplishment by these agencies, which had been directed by law to coordinate their efforts, was a stimulus for the rapid buildup of U.S. space activities.

Some of the questions raised in the joint hearings led to the creation on March 3, 1959 of the Subcommittee on Government Organization for Space Activities. The chairman appointed the following members:

STUART SYMINGTON, Missouri, *Chairman*

STEPHEN M. YOUNG, Ohio
THOMAS J. DODD, Connecticut,
HOWARD W. CANNON, Nevada

STYLES BRIDGES, New Hampshire
MARGARET CHASE SMITH, Maine
CLIFFORD P. CASE, New Jersey

The subcommittee held hearings during March, April, and May 1959 on "Investigation of Governmental Organization for Space Activities." The purpose was to insure an efficient organizational structure capable of coordinating civilian and military space programs and handling the funds required for developing the uses of outer space. After consulting key officials, the subcommittee noted that their differences of opinion on the meaning of a "comprehensive space program" made it necessary to define the term. In the report of August 25, 1959, the subcommittee formulated the following definition:

> Within the context of the National Aeronautics and Space Act of 1958, "a comprehensive space program" means a planned course of action, present and future, designed to achieve all the objectives set forth in the declaration of policy by taking into account the needs and requirements of all civilian and military agencies engaged in space activities.[1]

This definition again emphasized the intent of the Senate Space Committee that title II of the NASA Act on "Coordination of Aeronautical and Space Activities" should be fully complied with by the Executive Branch. Otherwise, the report concluded, weaknesses in liaison and coordination could "adversely affect the successful achievements of the Nation's space goals." [2] Subsequently, the annual reports sent to Congress by the President dealt with space and space-related activities of all agencies of the Government. Such reports are to be distinguished, of course, from those regularly required by law and received by Congress from NASA.

When the full committee held a hearing on nominations for the Space Council on May 19, 1959, one of the nominees, William A. M. Burden, brought out "the advantage of having a Council at the highest level of Government which enables any major factor in the program [such as] whether we get the proper emphasis in certain areas [or] whether the budget is large enough—to be discussed at the highest levels of Government. There is very little likelihood, now that we have the Council, that such questions will be lost in the shuffle, as they sometimes can be in a complex government such as ours. I think the Congress was wise to create the Council to carry out this function among others." [3]

The last action taken by the committee during this session of Congress was the publication of a staff report containing basic information on "Project Mercury: Man-In-Space Program of the National Aeronautics and Space Administration."

86th Congress, Second Session, 1960

(JANUARY 6, 1960, TO SEPTEMBER 1, 1960)

"Missiles, Space, and Other Major Defense Matters" was the subject of joint hearings held during February and March 1960 by the Senate

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[1] Governmental Organization for Space Activities. S. Rept. No. 806, 86th Cong., 1st sess. Aug. 25, 1959, p. 53.

[2] *Ibid.*

[3] Hearings before the Senate Committee on Aeronautical and Space Sciences on the nominations of William A. M. Burden and Dr. John T. Rettaliata to be members of the National Aeronautics and Space Council, 86th Cong., 1st sess. May 19, 1959, p. 16.

Committee on Aeronautical and Space Sciences and the Preparedness Investigating Subcommittee of the Senate Armed Services Committee. These committees had a common interest in launching vehicles, originally developed for missiles, and now available for peaceful scientific exploration of outer space. They were also interested in practicable applications of space science and technology. There was general agreement among the witnesses that the highest priority should be given within the Department of Defense to satellite systems for reconnaissance, communications, and warning in order to improve our deterrent defense posture. These purposes could be achieved by satellite systems, passive, rather than offensive, in nature, developed to improve information and thus facilitate quicker responses to hostile actions.

NASA's requirement for its own organization to develop and operate large space vehicle boosters led to President Dwight D. Eisenhower's proposal to transfer the Army Ballistic Missile Agencies' Development Operations Division to NASA. The NASA Act provided that prior to January 1, 1959, transfers of functions from other Government agencies to NASA could be made by the President without prior approval of the Congress. After that date, however, transfer proposals had to be submitted to Congress and became effective only if Congress did not adopt within 60 days a concurrent resolution opposing the transfers. The purpose of House Joint Resolution 567 was to waive the 60-day waiting period with respect to this particular transfer. A hearing was held by the NASA Authorization Subcommittee on February 18, 1960, to consider the transfer of the Dr. Wernher von Braun team at Huntsville, Ala., to NASA, and on February 26 Senator Stennis reported favorably on the transfer, which was subsequently made. Here, again, was evidence of the rapidity with which Congress acted in order to assist the executive branch in expediting the space program.

The NASA Authorization Subcommittee held hearings in March 1960 on appropriations for fiscal year 1961. Senator Stennis, the chairman, followed the same method for conducting the hearings that had proved so successful the year before. Part 1 covered "Program Detail for Fiscal Year 1961" and part 2, dated June 30, 1960, presented the "Scientific and Technical Aspects of NASA's Program." The report presented to the Senate by Senator Stennis on April 29, 1960, emphasized the manner in which the NASA budget was formulated. A step-by-step chronology revealed the role of the Bureau of the Budget in working with NASA on the preparation of estimates for various space activities.

NASA formulated a 10-year-mission plan with target dates from fiscal 1960 to 1970. The authorization request for fiscal 1961 was correlated with the attainment of these long-range objectives. The estimate was that $1 billion would be required for 1962 and $1½ billion annually in subsequent years in order to attain the particular objectives. At the time of these hearings the date set for manned flight to the moon was "beyond 1970".[1] Congress authorized $970 million and appropriated $964 million for fiscal 1961.

In these hearings, the subcommittee was particularly interested in finding out whether there was any undesirable duplication between the military and civilian space programs. It was noted that the Department of Defense had no long-range plan comparable to that of NASA and that the NASA plan had been only informally coordinated with the Defense Department. The subcommittee was particularly interested in NASA's long-range life sciences program and was assured that NASA would make full use of existing military facilities. The report adopted by the full committee emphasized the need for maximum cooperation and coordination in the space activities of these two agencies. The work of the subcommittee and the committee consisted of checking to see that there was compliance with the NASA Act which provided in its declaration of policy and purpose that there should be "The most effective utilization of the scientific and engineering resources of the United States, with close cooperation among all interested agencies of the United States in order to avoid unnecessary duplication of effort, facilities, and equipment."

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[1] S. Rept. No. 1300, 86th Cong., second sess., p. 78.

Several staff studies were published by the committee. "Radio Frequency Control in Space Telecommunications," published on March 19, 1960, was the first congressional study of this important subject which was to increase in significance within a few years. "Space Research in the Life Sciences," July 15, 1960, gave an inventory of related programs, resources, and facilities. "Policy Planning for Space Telecommunications," December 4, 1960, continued the study in depth of national and international implications of using satellites for communication purposes.

87th Congress, First Session, 1961

(JANUARY 3, 1961, TO SEPTEMBER 27, 1961)

Senator Robert S. Kerr became chairman of the Senate Space Committee on January 10, 1961, succeeding Senator Lyndon B. Johnson who was elected Vice President of the United States. At about the same time, Dr. T. Keith Glennan resigned as Administrator of NASA and President John F. Kennedy nominated James E. Webb to become the new Administrator. The first hearing under the chairmanship of Senator Kerr was on the nomination of Mr. Webb on February 2, 1961, a matter which received favorable action both by the committee and the Senate. Dr. Hugh L. Dryden continued in his position as Deputy Administrator.

In the following month, on March 23, 1961, the committee held a hearing on President Kennedy's nomination of Edward C. Welsh to be Executive Secretary of the National Aeronautics and Space Council. The committee and Senate approved this appointment which was one of the steps taken by the President to strengthen the Space Council.

On April 10, 1961, President Kennedy asked the Congress to amend the NASA Act so that the Vice President of the United States could become Chairman of the Space Council. He said that he wished the Council to become "an active and useful instrumentality." The Senate Committee on Aeronautical and Space Sciences held a hearing on April 19, 1961, on H.R. 6169 to amend section 201 of the NASA Act, and on the same day reported the bill favorably to the Senate. The amendment became Public Law 87–26 on April 25, 1961 (75 Stat. 46; 42 U.S.C. 2471), and provided for the location of the Space Council in the Executive Office of the President; removal of the President as a member and Chairman of the Council; the Vice President to become the Chairman; removing the additional Government member of the Council and the three civilian scientific members from the Council, thus leaving its membership composed of the Vice President, the Secretary of State, the Secretary of Defense, the NASA Administrator, and the Chairman of the Atomic Energy Commission. The President was also authorized to designate other Council members to act as Chairman in the absence of the Vice President. The Council was given the function of advising and assisting the President "as he may request" in the space and aeronautics fields, emphasizing particularly the development of a comprehensive program and cooperation among all departments and agencies of the Government.

Several other amendments to the NASA Act were considered during May and June 1961: S. 1857 on leasing property, indemnification, and the abolition of the Civilian Military Liaison Committee. Although hearings were held, the committee took no final action on these matters prior to the end of the 87th Congress.

The most significant event was President Kennedy's address to the Congress on "Urgent National Needs," May 25, 1961, in which he included four national goals for space.[1] He pointed out that with the advice of the Vice President, who is also Chairman of the Space Council, the Nation should play a leading role in space achievement. He asked that the Congress should make a judgment on the goals and accept "a firm commitment to a new course of action * * * which will last for many years and carry very heavy costs * * *." The goals set forth by the President were: (1) landing a man on the moon and returning him safely to earth before this decade is out; (2) accelerating development of the Rover nuclear rocket; (3) accelerating space satellites for worldwide communications; and (4) developing rapidly a satellite system for worldwide weather observation. The work of the Senate Space Committee was necessarily an important part of the reaction of Congress to this new challenge.

During February and March 1961, the full committee held hearings on NASA's scientific and technical programs, and in June hearings were held on NASA's authorization for fiscal year 1962, H.R. 6874. It had been decided that the full committee, rather than a subcommittee, should hold these hearings. With the enactment of Public Law 87–98 (75 Stat. 216) on July 21, 1961, NASA was authorized $1,784,300,000 for fiscal year 1962. After President Kennedy's call for an accelerated space program, it became necessary to consider the authorization of additional funds. To accomplish the space missions, more powerful boosters were needed, and existing launching areas at Cape Canaveral, Fla., were not extensive enough. NASA therefore requested additional funds to acquire 80,000 acres adjacent to Cape Canaveral. It was estimated that construction of launch facilities for large vessels would require 4 years or more and it was deemed urgent that the necessary authorization and appropriation be made by the Congress so that NASA could immediately acquire the land needed. The Senate Committee held hearings on this matter on September 1, 1961, reported the bill favorably the same day, and on September 5, the Senate voted in favor of raising its previous authorization for fiscal year 1962. New obligational authority was authorized in the amount of $1,855,300,000. The appropriation was $1,825,250,000.

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[1] H. Doc. No. 174, 87th Cong., first sess.

The committee published a staff study: "Legal Problems of Space Exploration: a Symposium," on March 22, 1961. This document continued the space law work which was begun by the special committee in 1958.

87TH CONGRESS, SECOND SESSION, 1962

(JANUARY 10, 1962, TO OCTOBER 13, 1962)

During this session of Congress the committee was concerned with the orbital flight of Lt. Col. John H. Glenn, Jr., authorization of funds to NASA for fiscal 1963, establishment of the Communications Satellite Corp., and publication of a number of studies on key aspects of the space program.

On February 28, 1962, Col. Glenn appeared with NASA officials and two other astronauts, Capt. Virgil I. Grissom and Comdr. Alan B. Shepard, Jr., to commemorate the orbital flight which demonstrated U.S. progress in exploring the space environment. On February 20, 1962, Col. Glenn made three orbits around the earth in *Friendship 7* spacecraft. At a speed of 17,545 miles an hour, the flight took 4 hours 55 minutes. Testimony given at this hearing constitutes an historical record of the brilliant performance of the astronauts and other members of the NASA team. This exciting event had an exhilarating effect upon public opinion, and proved the effectiveness of Project Mercury and the man-in-space program.

In June 1962, the full committee held hearings on the authorization of NASA funds for fiscal 1963. Essentially the testimony of witnesses was concerned with explaining in detail how NASA intended to implement the goals set by President Kennedy to achieve a safe manned lunar landing and return to earth, an accelerated meteorological satellite program, an operating communications satellite system, and progress in nuclear rockets.

The committee did not begin hearings until after the House had passed H.R. 11737 on May 24, 1962. Meanwhile, an additional request was received from NASA to authorize funds for land acquisition at Cape Canaveral and the Mississippi Test Facility. Prior to this year, NASA appropriations had been divided into salaries and expenses, research and development, and construction of facilities. The fiscal 1963 request combined salaries and expenses with research and development into an item designated "research, development, and operation." Specific provision in an appropriation act would entitle funds for this combination of activities to be made available without fiscal year limitation. The purpose of this change was to give NASA greater fiscal flexibility so that more effective use could be made of funds required for long-range projects and essential experimental efforts. The authorization for fiscal year 1963 was $3,744,115,250 and the appropriation of $3,674,115,000 was made available until expended.

The committee's attention was turned to communications satellite legislation on January 11, 1962, when the chairman, Senator Robert S. Kerr, introduced S. 2650 to authorize private ownership of the U.S. portion of a global communications satellite system. By unanimous consent the bill was referred to the Senate Committee on Aeronautical and Space Sciences. At the time, Senator Kerr said he had discussed the matter with Senator Warren G. Magnuson, chairman of the Senate Commerce Committee and also a member of the Senate Space Committee, advising him "that if in the deliberations of the bill by the Aeronautical and Space Sciences Committee, * * * any matter comes up with respect to which the Commerce Committee has jurisdiction, an agreement will be worked out whereby either the bill will be later referred to the Commerce Committee for its consideration, or that a program of joint hearings by both committees will be worked out." [1]

Senator Kerr and Senator Magnuson jointly introduced S. 2814 on February 7, a bill which incorporated President Kennedy's proposal for the establishment, ownership, operation, and regulation of a commercial satellite system. Senator Magnuson explained to the Senate that—

> In order that all may be advised of the respective relationships of the Committee on Aeronautical and Space Sciences and the Committee on Commerce to pending and future legislation dealing with communications satellites, I make the following unanimous-consent request: First, that the President's message on communications satellites, when received, be referred to the Committee on Aeronautical and Space Sciences; second, that when that committee has concluded its consideration of S. 2650 and the President's bill and message, they be referred to the Committee on Commerce; and third, that henceforth any proposed legislation dealing with the employment of any part of the radio or visible spectrum for communication or the transmission of intelligence through the use of satellites or otherwise shall not be considered by the Senate until such proposed legislation has been considered by the Committee on Commerce.[2]

There being no objection to this unanimous-consent request, it was so ordered by the Chair. Hearings were held by both committees, and on April 2, 1962, the Senate Committee on Aeronautical and Space Sciences reported favorably on S. 2814 which was enacted on August 31, 1962 as the Communications Satellite Act of 1962, Public Law 87–624 (76 Stat. 419). This act created the Communications Satellite Corp., a commercial system which was directed to be responsive to public needs and national objectives, and to contribute to world peace and understanding.

The committee published a series of prints on "Communication Satellites: Technical, Economic, and International Developments," "Meteorological Satellites," "Soviet Space Programs: Organization, Plans, Goals, and International Implications," "Manned Space Flight Program of the National Aeronautics and Space Administration: Projects Mercury, Gemini, and Apollo." The "NASA Act as amended through October 13, 1962, the end of the 87th Congress," was also published as a committee print.

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[1] Congressional Record, Jan. 11, 1962, p. 84.

[2] Congressional Record, Feb. 6, 1962, p. 1832.

88TH CONGRESS, FIRST SESSION, 1963

(JANUARY 9, 1963, TO DECEMBER 30, 1963)

The death of the chairman of the committee, Senator Robert S. Kerr, on January 1, 1963, occurred just before the beginning of the 88th Congress. Temporarily, Senator Richard B. Russell served as acting chairman until the election on February 25, 1963, of the new chairman, Senator Clinton P. Anderson. Senator Margaret Chase Smith became the ranking minority member.

Prior to this time, the committee had been designated as a minor committee; that is, a third committee on which a Senator was permitted membership in addition to two major committee assignments. On February 25, 1963, however, the Senate amended its rule XXV by passing Senate Resolution 88–90 providing that the Committee on Aeronautical and Space Sciences become a major committee; that is, one of two committees on which Senators are permitted membership. In order that Senators already serving on the Space Committee should not lose their membership thereon by this new ruling, the Senate provided that "those Senators who, as of January 9, 1963, were members of the Committee on Aeronautical and Space Sciences * * * shall be entitled to serve on three of the foregoing standing committees."

The first hearings during this session were held on March 19 on the President's nominations of the incorporators of the Communications Satellite Corp. The advice and consent of the Senate was required for these appointments, the duties being to organize the corporation, serve as its initial board of directors, and arrange for an initial stock offering. The nominations were first made on October 4, 1962, and referred jointly to the Committee on Aeronautical and Space Sciences and the Commerce Committee. Hearings could not be scheduled before the adjournment of the 87th Congress, and the incorporators served as recess appointments. Because of scheduling commitments, it was not feasible to conduct joint hearings with the Commerce Committee, so both committees held separate hearings on this matter. The Space Committee was particularly interested in the relationship of the National Aeronautics and Space Administration to the Communications Satellite Corp., and the amount of Government-funded research and development which would be made available to private industry.

In April and June, hearings were held on NASA's authorization for fiscal year 1964. The committee had considerable responsibility in analyzing whether NASA's request, which was almost $2 billion more than that of the previous year, was necessary for the attainment of the Nation's goals in space. Part I: Scientific and Technical Programs. presented detailed information essential for making a determination of the funds required for various types of programs, particularly the Apollo project for lunar exploration. Part 2: Program Detail, enabled the committee to coordinate policy, program, and budget in this highly technological and expanding field. The committee was especially interested in devising prudent restrictions on NASA's reprograming of funds. The authorization act provided that funds could not be transferred from research and development to construction of facilities unless the Senate and House Space Committees were notified by NASA and 30 days passed without objection by the committees or they gave their consent earlier. During this session of Congress NASA received an authorization of $5,350,820,400 and appropriation of $5,100 million for fiscal 1964.

On June 10 and 11, the committee held hearings on "Scientists' Testimony on Space Goals." The purpose of the hearings was to provide the committee with information to assist in evaluating (1) the overall goals of our space exploration effort in comparison with scientific aspects of other national goals, and (2) the relative emphasis on the various projects within the space program in connection with its consideration of NASA's authorization request. In addition to testimony on the space program and the problem of assigning priorities among the many projects demanded of the Government, the scientists and engineers made valuable comments concerning methods of improving advice on problems involving science and technology.

In November, hearings were held on the "Educational Programs of NASA," the purposes being to find out in greater detail why NASA has these programs, and how they are related to its missions as well as to total Federal efforts in education. The facilities, training, and research grant programs were studied.

Two staff reports were published. The first, in May 1963, was a compilation of "Documents on International Aspects of the Exploration and Use of Outer Space, 1954–62." This was part of the continuing effort of the committee to keep abreast of international space activities. The staff report on "U.S. Astronauts," published in November 1963, contained illustrations and biographies of the men selected to be astronauts.

88th Congress, Second Session, 1964

(JANUARY 7, 1964, TO OCTOBER 3, 1964)

The authorization hearings for fiscal year 1965 afforded the committee an opportunity to assess NASA's progress during the first 5 years of the space program. The committee had the responsibility of determining whether a firm base had been laid for the accomplishment of the goals set for the Nation during this crucial decade. Part I of the hearings, March 4, 1964, analyzed the scientific and technical programs in terms of the development of resources, skills, and benefits to the Nation. Large boosters and spacecraft had been developed for manned operations, and investments committed for engineering complexes capable of assembling, testing, and launching space vehicles. Experience had been gained in operating instrumented as well as manned spacecraft. The Mercury objective of an orbital flight and safe return of an astronaut had more than been met. Some 55 hours of manned flight had been successfully concluded between May 5, 1961, and May 15, 1963, in the suborbital flights of Alan B. Shepard and Virgil I. Grissom; in the three-orbital flight of John H. Glenn, Jr., the three orbits of M. Scott Carpenter, six orbits of Walter M. Schirra, Jr., and the 22-pass orbital flight of L. Gordon Cooper, Jr.

Building upon this foundation, the Gemini program was scheduled for long-duration flight, rendezvous and docking, maneuver capability, controlled reentry and landing, and the training of flight and ground crews. The Apollo program, to follow after Gemini, was planned for manned orbital flights looking toward lunar missions. It was necessary for the committee to study the pace of the program through successive fiscal years in order to determine whether there was justification for the budget requested to implement the objectives of U.S. policy. To achieve leadership in space, manned space flight was viewed as providing a focus for the development of the capabilities required for U.S. preeminence and the opportunity to demonstrate such preeminence clearly to the world.

The record of NASA in various types of space activities was reviewed by the committee. It was found that the United States was responsible for more than two-thirds of the 200 satellites and interplanetary probes launched in space. The great radiation belt surrounding the earth was discovered by the first U.S. satellite. Observations from outer space revealed the earth to be pear-shaped, a significant fact for navigation, mapmaking, charting flights, and calculating targets. In late 1962, the Mariner II space probe, operating 54 million miles from earth, transmitted 65 million pieces of information back to the earth for analysis. A tremendous record had been built up in space communications and meteorology. The Telstar and Relay space vehicles proved that communications satellites were practicable for world television broadcasts. The Syncom satellite was evidence of the feasibility of placing three satellites in a near-stationary orbit to provide a global communications satellite system. Advanced planning could be undertaken with confidence following the successful meteorological satellite, Tiros, whose pictures transmitted storm warnings.

Part 2 of the hearings, "Program Detail" was held during March 1964 and gave the committee an opportunity to look into the management of NASA's activities, international as well as national. The Special Committee on Space and Astronautics had been particularly anxious that NASA develop a strong program of international cooperation with other nations and groups of nations. It was evident that through bilateral agreements and leadership in the United Nations Committee on the Peaceful Uses of Outer Space, NASA had established a pattern of international cooperation on space projects. The global tracking system was evidence of success in making satisfactory agreements with other countries.

The committee's report made several special comments. It was concluded that by fiscal year 1966 NASA should have sufficient data on the availability and status of space vehicles to make discriminatory judgments between various alternatives on lunar landings and space probes. The objective of the committee was to prevent money from being spent to produce information which would not be needed or developed too late to be valuable for the lunar landing program.

The committee also held that prior authorization by Congress would be necessary for any expansion of the sustaining university program for fiscal year 1964. A comparison with other Federal agencies making contributions to education led to the conclusion that NASA's program was so large that it should be stabilized with no more spent in fiscal 1965 than had been expended in 1964.

The committee urged NASA to undertake extensive aeronautical research for a noise reduction program.

Interest in the role of nuclear power in space and the relation between NASA and the Atomic Energy Commission, led the committee to recommend to NASA "that the SNAP–8 program not end up as some other programs have, where the product of the research and development program reaches the critical point in demonstration only to have the user agency declare that there is no mission requirement, resulting in inability to flight test the product."[1]

The result of legislative consideration was that NASA was authorized $5,227,506,000 for fiscal 1965, and received the largest appropriation for any year in the period covered by this report—$5,250 million. However, $72,494,000 of this appropriation was made in response to a supplemental request of $141 million by NASA for fiscal year 1964.

89TH CONGRESS, FIRST SESSION, 1965

(JANUARY 4, 1965, TO OCTOBER 23, 1965)

On January 8, 1965, the Senate passed resolution 80–18, increasing the membership of the committee from 15 to 16, and the party ratio became 11 Democrats and 5 Republicans.

"National Space Launch Vehicles" became the subject of the first hearing of the session, held on January 26 and 27. Witnesses were called from NASA and the Department of Defense to give an analytical inventory of U.S. launch vehicle programs which were regarded by the committee as a basic requirement for all U.S. space activities. Inquiry was made into the orderly development of launchers in the near future, the next decade, and beyond. Detailed information was requested for the launch vehicles already developed, and for decisions on objectives, options, costing, and other relevant criteria. NASA's requirements for launchers from 1965 to 1975 were assessed in terms of the number needed for different categories of space missions. In particular, the history of three programs was reviewed: the 260-inch diameter solid motor program, the SNAP–8 program, and the M–1 engine project. These were later to become the subject of a more extensive inquiry during the authorization hearings which followed.

Beginning on March 8, 1965, the committee held hearings for its annual review of the NASA budget request. Part 1 was devoted to scientific and technical programs and program management; part 2 to program budget detail; and part 3 to post Apollo planning documents and information relating to the fiscal year 1965 authorization. The committee was concerned with the status, policy, and management of the U.S. space program, and conducted a detailed review to determine whether the program was on schedule, meeting performance goals, and in accordance with cost estimates.

The significance and priority of the Apollo program was recognized by the committee in supporting adequate funds for testing and any necessary remedial action. The request for studies of future manned missions was approached with caution, however, and the committee decided to reduce what it considered excessive amounts. Every major NASA program was subjected to careful scrutiny, examples being the Orbiting Astronomical Observatory (OAO), the Orbiting Geophysical Observatory (OGO), Explorer satellites and their scientific missions, and various parts of lunar and planetary exploration missions. Development of bioscientific research and development programs, meteorological and communications satellites, as well as launch vehicles for both unmanned and manned space exploration, were all given attention by the committee to assure that progress was being made in keeping with the amounts of money authorized to NASA.

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[1] S. Rept. No. 1054, June 2, 1964, p. 58.

Funds for NASA's efforts on the SNAP–8 nuclear power system had not been included by the President in the budget request for fiscal year 1966, the project being scheduled for termination. The project had a request level of $9.5 million, however, in the Atomic Energy Commission. The committee urged the administration to restudy its decision and reinstate the program if circumstances proved favorable and expressed willingness to consider any request for additional authority for SNAP–8.

Another case arose during these hearings with regard to the M–1 engine which was being terminated at the end of fiscal year 1965 for budgetary reasons. Although the committee recognized that the applications requirement for this engine would not be until post-1970, even possibly 1978–80, its significance for U.S. space activities in the future led to the conclusion that the administration should reassess the need for this capability, and if any additional authority were needed, the committee would consider the request. With regard to the 260-inch large solid motor scheduled for termination, the committee authorized funds in order to have authority available, if needed, but at the same time recommended against the inclusion of the funds in the fiscal year 1966 appropriations for NASA. The committee also urged NASA, in conjunction with the Atomic Energy Commission, to assure adequate support of nuclear rockets so that development would be early enough to make nuclear stages available by 1975–85.

The committee realized that economies in the national space program could be brought about by effective interdepartmental coordination. This was particularly true of NASA and the Department of Defense in connection with the Manned Orbiting Laboratory (MOL) where exchange of information could facilitate maximum use of all available resources and avoidance of duplications. In another instance, the joint interests of NASA, the Department of Defense and the Atomic Energy Commission lay in AEC development and demonstration of nuclear power systems and space missions required by or of interest to the user agencies. The committee declared its continuing interest in the space activities of these agencies. The committee regarded meteorological satellites as very valuable, the annual savings from better weather prediction ranging from estimates of $2 to $5 billion. The committee checked on coordination and cooperation between NASA and the Weather Bureau and was pleased to note that early problems had been worked out so that there was a clear definition of NASA's responsibility to develop weather satellite systems while the Weather Bureau was in charge of operations.

The committee concluded that the international space activities of NASA helped to support operations abroad, minimized dollar payments overseas, and reduced costs for the United States on those occasions when spacecraft produced by foreign scientists and engineers were launched by U.S. vehicles.

The result of the authorization process was $5,190,396,200 for fiscal year 1966, and the appropriation was only slightly lower—$5,175 million.

In August 1965, the committee devoted considerable attention in hearings on alternative goals for the national space program following the manned lunar landing. Considering the long leadtime required for new space missions, the committee wished to head off a costly letdown in space efforts at the conclusion of the Apollo program. Particular attention was paid to the inquiry on the comparative merits of manned and unmanned missions, the funds, time, and technology required, interplanetary exploration and the separate and combined interests of NASA and the Department of Defense in future space planning. Testimony indicated that the future would depend upon the successful yield of present programs in experienced personnel, operating procedures, and developments in space science and technology. NASA's future programs task group report to the President was given to the committee which noted the conclusion that priority should be given to near-term programs and within present budgets plan toward larger future missions. Testimony indicated that manned spaceflight would offer the opportunity late in 1970, and during the following decade, for systematic lunar exploration, large orbiting space stations, and exploration of Mars. Unmanned exploration could be undertaken of comets, asteroids, the Sun, and interplanetary space. The committee found that the interest of the Department of Defense from 1970 to 1975 was primarily with space navigation, meteorology, communications, antisatellite, and early warning systems. During the 1975–85 period, programs would naturally be influenced by advances in the state of the art of space technology, but mention was made of the probability of reusable spacecraft, launch vehicles, and multipurpose satellites. Both NASA and the Department of Defense were found to have well-organized methods for developing future plans combined with the realization that implementation would depend upon future decisions of the President and Congress.

During this session, the committee published two staff reports which demonstrated a continuing interest in international space activities: "U.S. International Space Programs; Texts of Executive Agreements, Memorandums of Understanding, and Other International Arrangements, 1959–65, in July 1965;" and "International Cooperation and Organization for Outer Space" in August 1965.

89TH CONGRESS, SECOND SESSION, 1966

(JANUARY 10, 1966, TO OCTOBER 22, 1966)

On January 25 and 26, 1966, the committee held hearings on national communications satellite programs to review the relationships between Government agencies and between the Government and the Communications Satellite Corp. Considering the NASA Act provision for interagency cooperation and the avoidance of unnecessary duplication, the committee sought testimony on military and civilian activities in space communications. The Defense Communications Agency, a Department of Defense management organization, explained its responsibility to plan and program the defense communications system and monitor its operations on a continuous basis. Furthermore, the Director as manager of the national communications system, coordinated the activities of the Department of Defense, Federal Aviation Agency, Department of State, National Aeronautics and Space Administration, General Services Administration, Atomic Energy Commission, Department of Commerce, Department of Interior, the U.S. Information Agency, and the Federal Communications Commission. The Defense Communications Agency established a Communications Satellite Project Office with responsibility for integrating the space system with the normal ground system. The committee was especially concerned with cooperation on space research and development between the Department of Defense and NASA as well as with the communications backup for the Apollo lunar mission.

The Communications Satellite Corp. reported to the committee progress made since the passage of the Communications Satellite Corporation Act of 1962 which provided that a commercial communications satellite system be established in cooperation with other countries as expeditiously as practicable. An impressive record of accomplishments was noted: the negotiation of agreements to establish and operate the space portion of the global satellite system (which had been signed by 48 countries up to that time); the financing of the corporation by a successful stock offering; the operation across the Atlantic of regular commercial telephone and record service via the Early Bird satellite. The committee received testimony from Comsat officials that close liaison was maintained with the national communications system and with NASA there was regular and complete exchange of research and development data relating to communications satellite technology. Various regulatory functions were performed by the Federal Communications Commission in accordance with the Comsat Act. Attainment of the original objective of establishing a global system by 1968 had been so far advanced that it appeared the goal could be initiated by late 1966.

The committee reviewed NASA's basic objectives in space communications: the development of required technology; the application of satellites to future communication needs; and meeting NASA's responsibility under the Comsat Act of 1962: provision of launching services to Comsat, giving technical advice to the Federal Communications Commission, consultations on research and development with Comsat.

The amount and degree of interagency coordination required for space communications—only one of the uses of the space environment—underlined the foresight of the committee's original conclusion in 1958—that space activities required interdepartmental cooperation and coordination at a high level in accordance with established priorities.

During February and March 1966, the committee held hearings to authorize appropriations to NASA for fiscal year 1967. The budget was considered according to NASA's activities in research and development, construction of facilities, and administrative operations. Among the major programs reviewed in detail were the Gemini and Apollo projects. The Gemini objectives were to increase operational proficiency and knowledge of technology in manned space flight, the program calling for the capability to investigate long-duration flight, develop rendezvous techniques and postdocking maneuvers, develop reentry flight path control, attain flight and ground crew proficiency, develop extra vehicular capability, and conduct scientific experiments. The Apollo program objectives were presented to the committee for authorization in terms of making the United States preeminent in space by building a broad-based capability for manned space flight and demonstrating this capability by landing men on the moon and returning them safely to earth within this decade. Numerous other programs indicating practical and beneficial use of the space environment were reviewed; for example, meteorological satellites, communication and applications technology satellites, research in space medicine, and scientific results of the tracking and data acquisition system. In accordance with the usual practice of the committee, the published hearings were well illustrated so that scientific and technical information was presented in a graphic form for ease in decisionmaking. The committee agreed in conference to an authorization totaling $5,000,419,000. NASA's appropriation for fiscal year 1967, contained in the Independent Offices Appropriations Act, was $4,968 million.

On May 19, 1966, the committee published as Senate Document No. 90 a staff report entitled, "Policy Planning for Aeronautical Research and Development." The committee had a longstanding interest in the area of aeronautical research and development, and had taken much testimony during the regular authorization hearings on NASA's programs in this area. Growing concern about the adequacy of aeronautical R. & D. led the committee staff to recommend that a more intensive study be undertaken in this area with particular emphasis on policy planning. Consequently, the Science Policy Research Division of the Legislative Reference Service, Library of Congress, was asked to prepare a staff report along these lines for the use of the committee. The study thoroughly investigated the many diverse aspects of the problem, identified a logical sequence of issues, and raised a number of critical questions in connection with each issue. These issues and questions, then, formed the basis for hearings to be held at the beginning of the following session of Congress.

In July 1966, the committee published a staff report on "Space Treaty Proposals by the United States and the U.S.S.R.," a background committee print prepared for use during the period when provisions were being negotiated for an outer space treaty on the moon and other celestial bodies.

In accordance with the committee's interest in the space program of the U.S.S.R., a staff report was prepared by the staff of the Legislative Reference Service and other divisions of the Library of Congress on "Soviet Space Programs, 1962–65: Goals and Purposes, Achievements, Plans, and International Implications," and published as a committee print on December 30, 1966.

90TH CONGRESS, FIRST SESSION, 1967

(JANUARY 10, 1967, TO DECEMBER 15, 1967)

During the organization of the 90th Congress, Senator Byrd, Jr., Democrat from Virginia, and Senator Aiken, Republican from Vermont, resigned from the committee and Senator Brooke, Republican from Massachusetts, and Senator Percy, Republican from Illinois, joined the committee.

The committee initiated its program for the first session, 90th Congress, with 4 days of hearings, January 25, 26, 27, and February 27, 1967, on aeronautical research and development policy. These hearings were designed to review the adequacy of policy planning for aeronautical research and development in the United States and to review what the Congress, the executive branch of the Government, and private industry should do so that the Nation will continue to be strong and viable in aeronautics. The decision to review this area of the committee's responsibility was based upon a staff study issued by the committee on May 19, 1966, wherein the indispensability of the aviation and airline industry to the Nation was illustrated by an estimated contribution to the gross national product in 1964 of $23.7 billion. This significance was reemphasized by an updating during the hearings which reflected an estimated contribution of $30.8 billion during 1966—an increase of 30 percent in 2 years. The committee received testimony from NASA, the Aerospace Industries Association, the newly formed Department of Transportation, the Federal Aviation Agency, the Air Transport Association, the Department of Defense, and the National Aeronautics and Space Council. Overriding events, however, prevented the committee from assessing its findings, and consequently issuance of the committee report was deferred until the following session.

The Nation entered 1967 with an outstanding record of 10 successful two-man Gemini manned flight missions—five in 1966. Gemini XII, launched on November 11, 1966, and recovered on November 15, 1966, completed this highly successful program. The three consecutive successful unmanned Saturn I–B launches in 1966 appeared to qualify the follow-on Saturn I–B/Apollo spacecraft system for manned operation. However, all of these accomplishments were marred on January 27, 1967, when three astronauts died in a disastrous fire which swept the Apollo 204 spacecraft during a launch pad test at the Kennedy Space Center. On January 28, 1967, NASA appointed the Apollo 204 Review Board to determine the cause of the accident. Also, on January 28, 1967, the chairman, after conferring with the ranking minority member of the committee, Senator Smith, announced that the committee would make a full review of the tragedy utilizing the data developed by the NASA review board and such other information as necessary to fulfill the committee's responsibility. The committee's purpose and approach in undertaking this review was set forth by Chairman Anderson on the floor of the Senate on January 31, 1967. Briefly, it was the committee's purpose to assure that the accident was assessed in an objective framework both with respect to its cause and how it related to the national space program and the effort to establish the preeminence of the Nation in space. In so doing, however, it was the committee's intent that its actions would in no way impede the NASA inquiry.

The committee received accident investigation progress reports and preliminary findings and program impacts from NASA officials on February 7 and 27. On April 9, the committee was furnished the report of the Apollo 204 Review Board together with the detailed documentation of the many areas of investigation that resulted in the conclusions of the Board. The committee took testimony from the eight-member Apollo 204 Review Board on April 11, 1967. The committee was impressed by the exhaustive and thorough review of the accident undertaken by the Board and by its objectivity. The latter was pointedly supported by the critical findings the Board made of certain NASA management and technical operations. The complexity of the Apollo spacecraft system and the postfire spacecraft condition prevented the Board from establishing the precise ignition source; however, a most probable initiator was isolated as an electric arc, which, combined with the 16.7 pounds per square inch 100-percent oxygen cabin environment and the presence of combustible material, resulted in a very high temperature and rapidly propagating fire.

The committee held further hearings on April 13, 17, and May 9, during which NASA reported in great detail on changes in spacecraft design, reassignment of certain hardware responsibilities, changes in test and safety procedures, and the plans for reestablishment of manned flight schedules. A delay of approximately 1 year was forecast at that time; however, this estimate later proved to be too optimistic in the light of the work to be accomplished. The committee also received testimony on May 4, 1967, from the president, North American Aviation, Inc., the spacecraft contractor, and the vice president in charge of the spacecraft program.

In view of the length of time that would be required to effect the corrective actions, the committee suspended its formal accident review activities until NASA, in January 1968, was able to present a detailed report on that status of actions taken on the Apollo 204 Review Board report.

The NASA authorization request of $5,050 million was introduced as S. 791 on January 31, 1967. Subsequently an addition to the nuclear rockets program was submitted by the President and the request was reintroduced on March 15, 1967, as S. 1296 in the amount of $5,100 million. Inasmuch as the committee was deeply involved in its review of the Apollo 204 accident through this period, it became clear that there could be a significant impact upon the NASA program and the required funding for the fiscal year. The committee held hearings on April 18, 19, 20, 21, 25, 26, and 27, receiving testimony from NASA witnesses as well as witnesses from the Atomic Energy Commission and the Department of Defense with respect to their participation in national space activities. The committee reported S. 1296 in the amount of $4,851,006,000 which was passed by the Senate without modification on June 28, 1967. Although nominal cuts were made in other program activities, the principal reductions made by the Senate were the deletion of the proposed Voyager program, a large, complex, unmanned spacecraft mission to the planet Mars, and a substantial cut in the proposed post-Apollo manned-flight activities in view of the Apollo program slippages resulting from the Apollo 204 accident. The

Senate action reduced the NASA request $248,994,000. After a conference with the House to resolve differences, Public Law 90–67 (81 Stat. 168) was enacted on August 21, 1967, authorizing $4,865,751,000, a reduction of $234,249,000 in the NASA request for fiscal year 1968. Subsequently, in Public Law 90–131 (81 Stat. 384) enacted November 8, 1967, $4,588,900,000 was appropriated against the authorization previously enacted—a reduction of $511,100,000 in the budget request.

Throughout the authorization and appropriation process, the committee was concerned with the cost impact of the *Apollo 204* accident, both as to timing and extent. As the committee studied the situation, it became apparent that there would be no immediate impact on the NASA fiscal year 1967 financial plan or the fiscal year 1968 budget request because of offsetting factors such as the suspension of flight schedules and changes in spacecraft production planning which permitted adjustments, within the total NASA budget framework for these years. The overall impact of the accident would appear in future years as indicated by NASA testimony during the May 9, 1967, hearing that the total estimated cost for the Apollo program had increased $472 million from $22.718 to $23.190 billion. However, in the event a highly successful recovery was made from the accident, an early achievement of the lunar landing objective would permit an allocation of unused Apollo hardware and an appropriate share of operational expenses to the Apollo Applications Program with an offsetting reduction in the cost of the Apollo program. In view of the accident, the additional costs and the changes in schedules resulting therefrom, and the congressional reduction of $511,100,000 in the NASA request, the committee held a hearing on November 8, 1967, at which time NASA officials presented their operating plan and described in detail how they proposed to use appropriated funds for fiscal year 1968. This enabled the committee to develop a current picture of the manned and unmanned flight programs as well as review NASA's planning for follow on activities such as lighter weight spacecraft and less complex missions to take advantage of the Mars planetary opportunities in 1971 and 1973.

The committee continued its cognizance of international space activities by publishing a staff report on "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies," March 1967.

90TH CONGRESS, SECOND SESSION, 1968

(JANUARY 15, 1968, TO OCTOBER 14, 1968)

The committee, following up its comprehensive review of the disastrous Apollo spacecraft fire in 1967, issued part 8 of its hearings which included a NASA report entitled, "Status of Actions Taken on the Apollo 204 Review Board Report." The report described the actions taken by NASA through December 28, 1967, to implement the findings, determinations, and conclusions of the Apollo 204 Review Board and its 21 panels. Shortly thereafter the committee, having taken over 700 pages of testimony during 1967, issued its report of the Apollo 204 accident. The report, designated Senate Report No. 956, January 30, 1968, included the findings and conclusions of the committee together with its recommendations. While generally agreeing with the majority view of the committee, Senators Mondale, Brooke, and Percy issued additional views which were made a part of the report.

While the report placed blame on no individual, the committee pointed out that NASA failed to recognize that the tests being conducted in the spacecraft at the time of the accident were extremely hazardous. Therefore, adequate safety precautions were neither established nor observed for the test.

It is significant that during the 19 months which elapsed before programing another manned space flight, extensive changes in management and in operating procedures took place in the manned spaceflight program. Every possible precaution was taken to insure that such a catastrophe would not again occur. The complete success of the 11-day, 163-earth-orbit flight of Apollo 7 which was launched on October 11, 1968, and recovered on October 22, 1968, has proven out the block II Apollo spacecraft and would indicate that the manned spaceflight program was again proceeding on schedule and that a manned lunar landing and return in calendar year 1969 would still be possible.

On January 31, 1968, the committee, having conducted hearings in 1967 on aeronautical research and development, issued its report, designated Senate Report No. 957, on aeronautical research and development policy. The report contained a summary of the views of the 12 witnesses who testified at the hearings, together with certain conclusions and recommendations of the committee.

No attempt was made to reach definitive answers to all issues and questions concerning Federal aeronautical research and development policies. This subject concerns many of the departments and agencies of the Federal Government and many of the issues involved affect the jurisdiction of committees other than this committee. The committee sought only to establish that some of the old patterns in this field were changing and that numerous issues regarding policy toward aeronautical research and development were in need of further consideration by both the executive and legislative branches of the Government.

On February 6, the committee held a hearing on the nomination of Dr. Thomas O. Paine as Deputy Administrator of NASA, a vacancy created by the resignation of Dr. Robert C. Seamans, January 1, 1968. The committee unanimously recommended the nomination which was subsequently approved by the Senate.

Beginning on February 27, 1968, the committee held hearings for its annual review of the NASA budget request. Parts 1 and 2 were devoted to program budget detail and part 3 to the nuclear rockets program.

NASA's budget request of $4,370,400,000 for fiscal year 1969 represented the smallest NASA budget since 1963. Despite the austerity represented by this budget, the committee approached its responsibilities with the awareness that the Nation's fiscal condition required that the budgets of all departments and agencies had to be carefully analyzed in order to keep the Government's expenditures to the minimum. The committee examined each program in depth and recommended a total cut of $219,840,000 in NASA's budget request, leaving a total of $4,150,560,000 to be authorized for NASA for fiscal year 1969.

The committee recognized that this amount represented a severely limited budget for NASA, yet one which would preserve the integrity of the Nation's civilian space program by providing for a viable manned space effort supported by the research necessary to effect the preeminence of the United States in space technology in the years ahead.

Authorizations were provided for NASA's manned space efforts to assure the priority of the Apollo program. Funding was authorized for continuing manned space flight after the initial landing on the moon although the reduction in funds for this program would require operations at a reduced level.

While cuts were recommended in every research and development program, the committee was careful to authorize funds necessary to continue all such programs, although in many cases not on as ambitious a scale as had been formerly contemplated.

Finally, after a thorough review of the nuclear rockets program, the committee, while reducing the authorization slightly, again signified its support for nuclear rocket development which the committee considered the only major space propulsion development capable of providing the advanced propulsion necessary to meet future requirements of space exploration.

Despite the reductions made by the committee, the NASA fiscal year 1969 budget sustained a further cut on the floor of the Senate of $137,487,000, which reduced the total amount of the authorization to $4,013,073,000. This amount was agreed to by the House and the appropriation was only slightly lower—$3,995,273,000.

In April the committee held a hearing at which time NASA witnesses summarized the problems encountered in the second flight of the Saturn V launch vehicle. During this flight certain problems occurred with the J–2 engine, a longitudinal vibration induced in the latter portion of the operation of the first-stage engines (a phenomenon commonly called pogo) was discovered, and there was a peeling off of a part of the spacecraft during the latter stage of the first-stage burn. NASA witnesses were confident that these problems could be overcome and that NASA could quickly move forward to the manned rating of the Saturn V. In August NASA announced that the problems had been overcome and that the Saturn V was ready for manned flight.

During the year several changes took place in the membership of the committee. On June 25, 1968, Senator Walter F. Mondale (Democrat of Minnesota) resigned from the committee to take another committee assignment. On September 12, 1968, Senator Edward W. Brooke (Republican of Massachusetts) and Senator Charles H. Percy (Republican of Illinois) resigned from the committee to take other committee assignments, and on the same day Senator Mark O. Hatfield (Republican of Oregon) and Senator Charles E. Goodell (Republican of New York) became members of the committee.

On October 3, 1968, the committee held a hearing at which time NASA testified on its proposed operating plan for fiscal year 1969. This hearing marked the last appearance before the committee of Administrator James E. Webb who retired officially on October 7, 1968, after having served as Administrator of NASA for over 7 years. Dr. Thomas O. Paine, who became Acting Administrator of NASA on October 7, testified with respect to NASA's interim operating plan which had been placed in effect on August 8, 1968. NASA had been required to make certain programmatic changes as a result of an appropriation reduction of $375 million in the President's budget request for fiscal year 1969. Furthermore, as a result of provisions in the Revenue and Expenditure Control Act of 1968 requiring the President to make further reductions in the total budget in order to reduce Federal expenditures for fiscal year 1969, NASA anticipated further fiscal limitations below the amounts appropriated by the Congress. It, therefore, had restructured its programs for fiscal year 1969 based on a self-imposed limitation totaling $3,850 million. While NASA had not been officially informed as to its apportionment from the Bureau of the Budget at the time of this hearing, the committee was informed later that the $3,850 million was in fact the amount NASA would be permitted to use of fiscal year 1969 appropriations.

During the year the committee continued to follow closely all aspects of the international space activities of the United States, and in July issued a staff report on "Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched Into Outer Space: Analysis and Background Data."

As the period of time covered by this report came to a close, the committee welcomed the news of NASA's success with the Apollo 7 flight. Astronauts W. A. Schirra, D. F. Eisele, and R. W. Cunningham were launched into earth orbit on October 11, 1968, and completed 163 revolutions in 10 days 20 hours—the longest period of manned space flight in history. All primary mission objectives were accomplished as well as all planned detailed test objectives including three not originally scheduled.

This outstanding achievement was part of the background preparation which made it possible for NASA to announce on November 12, 1968, that the Apollo 8 mission would be prepared for an orbital flight around the moon but not earlier than December 21, 1968. The committee learned that Dr. Thomas O. Paine, Acting Administrator of the National Aeronautics and Space Administration, with all top NASA officials participating, had made a final review of the mission and stated that—

> After a careful and thorough examination of all systems and the risks and benefits involved in each of the mission alternatives, we have concluded that we are ready to fly this advanced mission around the moon. Frank Borman and his crew are eager to proceed; our engineers unanimously recommend this mission; and, without being overconfident, we believe that we understand the hazards involved and are now ready to take this next step forward in the Nation's space program.

On December 21, Frank Borman, James A. Lovell, Jr., and William A. Anders took off on man's first flight toward the Moon. They entered lunar orbit, completed 10 revolutions of the Moon and then returned safely to Earth, splashing down on December 27. This flight proved that the United States could safely fly men to the Moon and bring them back, thus paving the way for the later Apollo missions to explore the lunar surface.

91st Congress, First Session, 1969

(JANUARY 3, 1969 TO DECEMBER 23, 1969)

On March 14, the nomination hearing for Dr. Thomas O. Paine to be Administrator of NASA, was held. After the hearing, the committee met briefly and recommended that the nomination be approved.

In appreciation of the need to take a fresh look at the Nation's long-term goals and plans in space—civilian and military, manned and unmanned—the President constituted a Task Group consisting of the Vice President as Chairman, the Secretary of Defense, the Administrator of NASA, and the President's Science Adviser. The President asked that in this planning process the members of the Task Group consult widely—with industry, the scientific community, and the Congress.

In its initial meetings, the Task Group considered the immediate problems in the manned space flight program. Within this group, Paine won acceptance for the concept of the Space Shuttle. In its original conception, the Space Shuttle would have consisted of two vehicles, a booster and an orbiter, both fully reusable. The metal vehicles would be launched vertically. At altitude the booster vehicle would separate, return to the launch area, and land like an airplane. The orbiter would fly to orbital speed and altitude, deploy satellites into orbit, repair or retrieve satellites already in orbit, and, using an additional stage, boost payloads throughout the solar system. At the conclusion of its mission, the orbiter would return to earth and also land like an airplane. The big change from earlier launch vehicles would be that both the booster and the orbiter would be refurbished and reused for up to 100 flights, sharply reducing the cost per pound of payload in orbit. The Shuttle could carry up to a seven-man crew in orbit; four of these could be non-pilot scientists who went along only to operate their experiments in a laboratory carried in the Shuttle cargo bay. Missions with a flight crew only could deliver 65,000 pounds of assorted satellites into orbit and could land on Earth with a returning payload of 31,900 pounds.

In the annual authorization hearings, the recent successes in manned space flight indicated there was a very good possibility that the national goal of landing a man on the moon and returning him safely would be attained in the next few months. This accomplishment would raise an immediate question as to the future direction of the national space program in implementing the objectives laid down in the Act of 1958.

Closely coupled with these questions was the maturing of space technology and the application of this technology in an increasing role to the immediate benefit of men on earth.

From a historical standpoint, perhaps the most significant fact about the fiscal year 1970 budget request of $3.715 billion for NASA was that both President Johnson and President Nixon, after careful review in a context of reduced government spending, recognized the importance to the United States of a strong and continuing program in space and aeronautics and the need to arrest the succession of substantial reductions in NASA's budget that had characterized the past several years.

The Apollo 9 flight (March 3–13) was the first manned test of the Lunar Module and was completely successful.

A final test was made at lunar distance. On May 18, Apollo 10 took off. Once in lunar orbit, the crew separated the Lunar Module from the Command Module, descended to within 8.7 miles of the surface, fired the ascent system, and docked with the Command Module. Now all systems were "go."

On July 16, Apollo 11 lifted off for the ultimate mission of Apollo. On July 20 the LM separated and descended to the lunar surface. At 4:18 p.m. (EST) came the word from Astronaut Neil A. Armstrong, "Houston—Tranquility Base here—the Eagle has landed." After checkout, Armstrong set foot on the lunar surface—"one small step for man—one giant leap for mankind." The eight-year national commitment had been fulfilled. Armstrong set up the TV camera and watched his fellow astronaut Edwin E. Aldrin, Jr., join him on the lunar surface, as Michael Collins circled the moon in the Command Module Columbia. More than one-fifth of the Earth's population watched TV pictures of two space-suited men plodding around gingerly in a ghostly, unlikely world.

The astronauts returned to an ecstatic reception. For a brief moment, man's day-to-day divisions had been suspended; the world watched and took joint pride in man's latest achievement in exploration.

On August 5, hearings were conducted on "Future NASA Space Programs." The Committee met with Dr. Paine and other NASA officials to discuss future NASA space programs. Areas of particular interest were: manned lunar exploration; the Apollo Applications Project (later named Skylab); NASA's plan for a large manned space station and an associated space transportation system; planetary exploration; and plans for astronomy, bioscience and space applications.

The report of the Space Task Group was submitted to the President on September 15. It offered three levels of effort: Option I would feature a lunar-orbital station, an Earth-orbital station, and a lunar station base in the 1980s; Option II envisioned a Mars manned mission in 1986; Option III included initial development of space station and reusable shuttles but would defer landing on Mars until some time before the end of the century. Eventual peak expenditures on these options were estimated to vary from $10 billion down to $5 billion per year. Additional study went on for more than two years.

Apollo continued on its impressive course. Apollo 12 (November 14–24, 1969) repeated the Apollo 11 adventure at another site, the Ocean of Storms. One attraction of that site was that the unmanned Surveyor 3 had been there for two and a half years. A pin-point landing put the LM within 600 feet of the Surveyor spacecraft. In addition to deploying scientific instruments and collecting rock samples from the immediate surroundings, Astronauts Charles Conrad and Alan Bean cut off pieces from Surveyor 3, including the TV camera, for return to Earth and analysis after 30 months of exposure to the lunar environment.

On November 25, the nomination hearing for George M. Low to be Deputy Administrator of NASA was held by the Committee. After answering questions, Mr. Low was recommended unanimously for confirmation.

91st Congress, Second Session, 1970

(JANUARY 19, 1970 TO JANUARY 2, 1971)

On February 20 and 27 and March 4, hearings were conducted on the NASA authorization for fiscal year 1971. The budget request totaled $3.333 billion. The authorization was $3.411 billion and the appropriation $3.269 billion.

Dr. Paine, NASA Administrator, made it clear that if the fiscal year 1971 budget is regarded as a single action and its broad implications are not carefully considered, a true picture of the basic changes in the direction of this Nation's space effort will not emerge.

This request was the lowest NASA budget since fiscal year 1962. This budget, though austere, was strongly oriented to the future.

Regarding international space cooperation, Dr. Paine summarized on March 11 what NASA is doing to give other nations an opportunity to study future programs and to determine the extent to which they may wish to join us in meeting the challenges of the 1970's.

The base for international cooperation was established in the 1960's.

The United States would not have been in such an excellent position to seek increased international cooperation were it not for the sound base of extensive and successful cooperation established in the 1960's with over 70 countries. NASA has entered into almost 250 agreements for international space projects.

NASA has orbited foreign satellites, flown foreign experiments on our spacecraft, and participated in more than 500 cooperative scientific rocket soundings from sites in all quarters of the world. It has involved more than 50 foreign scientists in the analysis of lunar surface samples and provided for direct daily reception of data from U.S. weather satellites by some 50 countries. These are just a few of the cooperative efforts of the 1960s.

A hearing on space program benefits was conducted on April 6, 1970. These benefits were categorized into seven types:

1. The NASA technology utilization program, listing reports, abstracts, conferences, computer programs, inventions and patents.
2. NASA scientific and technical publications, of which more than 1.6 million were distributed in 1969.
3. The space program's contribution to American schools, including audiovisual material and curriculum resources.
4. Each of the Space Research Laboratories built at 34 institutions of higher learning across the Nation during the 1960's and in which more than a thousand young men and women have already done graduate work.
5. Public interest in NASA, including in 1969 the 968,830 letters received, the 37.6 million people who viewed NASA exhibits, the 9.8 million who saw NASA films directly, the 248 million who saw them

on TV, the quarter of a million people who attended talks by NASA speakers, and the 2,600,000 visitors from all over the world who toured NASA's facilities.

6. News media coverage of NASA's activities, including the 3,497 newsmen from 57 countries who covered Apollo 11, the 1,167,559 NASA photos distributed to the press, the 734 U.S. TV stations that subscribe to NASA's film features, and the 3,200 U.S. radio stations and 954 newspapers that subscribe to NASA features.

7. NASA reliability and quality assurance program lists its publications and provides examples of the Alert program, which rapidly informs other agencies and industry of hazardous parts and materials of general concern, including the cause and recommended corrective action.

On April 24, 1970, there was a hearing on the Apollo 13 mission. This hearing covered:

The accident aboard the spacecraft Odyssey while bound for the moon 55 hours and 54 minutes after launch;

The immediate steps taken by flight controllers at Mission Control in Houston and the flight crew to contain the situation;

The ensuing 300,000-mile voyage around the moon and back to earth using the lunar module Aquarius as a lifeboat;

The investigative measures initiated within NASA immediately after the successful splashdown, and

NASA's view of the impact of the Apollo 13 accident on the U.S. space program.

A review board was established to investigate the accident. The review board's report was heard in hearings on June 30, 1970.

Another sign of the times was that NASA was increasingly becoming a service agency. In 1970 NASA for the first time launched more satellites for others—Comsat Corp, NOAA, DoD, foreign governments, etc.—than for itself. Five years before only 2 of 24 launches had been for others. Clearly this trend would continue through the 1970s.

Dr. Thomas O. Paine, NASA Administrator, resigned to return to industry in September 1970. Dr. George M. Low, Deputy Administrator, became the Acting Administrator for the rest of the year.

92D CONGRESS, FIRST SESSION, 1971

(JANUARY 21, 1971, TO DECEMBER 17, 1971)

On January 31, Apollo 14 lifted off, continuing the scientific exploration of the moon. The major new item on this mission was a transporter—a cart on which to carry equipment and rock examples. The mission was a success. Astronauts Alan B. Shepard, Stuart Roosa and Edgar Mitchell brought 96 pounds of lunar material with them when they splashed down on February 9.

Dr. James C. Fletcher was nominated to become the Administrator for NASA, replacing Dr. Thomas O. Paine who resigned in September 1970 to return to industry. On March 10, the Committee held a hearing on the nomination of Dr. Fletcher.

On March 17, 1971, hearings were held on space cooperation between the United States and the Soviet Union.

These hearings concentrated on the agreement reached in October 1970 between NASA and the Soviet Academy of Sciences on compatible docking problems for United States and Soviet manned spacecraft; and on the preliminary agreement reached in January on a wider range of aspects, including lunar sample exchanges, observations of the national environment and manned space programs.

Dr. Fletcher took office in April 1971 and immediately reviewed the status of the Space Shuttle. He became convinced that the Shuttle as then envisioned was too costly to win Congressional approval. Total costs for its development were estimated at $10.5 billion. Fletcher instigated a rigorous restudy and redesign that cut the cost in half, mainly by dropping the plan for unassisted takeoff and substituting two external, reusable solid rockets and an expendable external fuel tank. This concept proved to be acceptable.

On March 30 and April 1, 2, and 5, the Committee conducted hearings on NASA Authorization for fiscal year 1972.

NASA's fiscal year 1972 request totaled $3,271,350,000.

The committee reviewed closely NASA's request for four new research and development programs: The Space Shuttle main engine, the high energy astronomical observatory (HEAO), the outer planetary missions, and the short takeoff and landing (STOL) aircraft. In general, the committee was interested in the basic policies being followed by the agency in completing existing programs and in selecting and undertaking new programs and in costs, schedules, and management.

The program for fiscal year 1972, like that for fiscal year 1971, was directed at the objective stated in the President's policy statement on space of March 7, 1970. NASA started toward new objectives from a lower budget level than estimated in earlier planning studies.

Congress approved a total authorization of $3,354,950,000.

On September 24, the Committee released the document entitled, "Statements by Presidents of the United States on International Cooperation in Space, A chronology—October 1957–August 1971." It offered documentation on more than a decade of a consistent national policy for international cooperation in space that has been a part of the U.S. space program.

The Apollo 15 mission to the moon in July and August marked a significant expansion of man's activities on the lunar surface. This mission was the first to use the lunar roving vehicle, which enabled two astronauts to drive several miles on the lunar surface and greatly extend the area of scientific investigation. Astronauts David R. Scott and James B. Irwin made three separate excursions on the surface during which they collected 170 pounds of samples.

This mission also was the first flight of the "J" model Apollo command/service module, which carried an array of scientific instruments, including two cameras, in a special module. Astronaut Alfred E. Worden retrieved film from this module during an excursion outside the command module while on the return to Earth.

OSO–7, launched on September 29, was the first satellite to record on film the beginning of a solar flare and the consequent solar streamers of hot gases that extended out 6.5 million miles; it would also discover "polar ice caps" on the Sun—dark areas several million degrees cooler than the equatorial surface temperatures.

Mariner 9, launched November 10, was the first spacecraft that went into orbit around another planet. The early months in orbit were discouraging; a gigantic dust storm covered most of the Martian surface for two months.

On December 9, the Committee issued the document, "International Cooperation in Outer Space: A Symposium."

This study was undertaken because of the committee's continuing interest in international space activities.

It was the latest in a series on international space activities published by the Committee.

Also on December 9, the Committee published "Soviet Space Programs, 1966–70."

This study sought to identify Soviet space goals and purposes, organizations, resources, facilities and hardware, past and on-going programs of flights, research and applications, and projections of expected future plans, together with the international political and legal implications of these policies.

This report was based upon unclassified sources, both Soviet announcements and independent checks on such data taken from U.S. and British observations.

92nd Congress, Second Session, 1972

(JANUARY 18, 1972 TO OCTOBER 18, 1972)

Planetary exploration has opened further vistas of other worlds. Pioneer 10, launched March 2, 1972, left the vicinity of Earth at the highest velocity ever achieved by a spacecraft (31,800 miles per hour) and took off on an epic voyage to the huge planet Jupiter. Giant of the solar system, swathed with clouds, encircled by a cluster of moons, Jupiter was a necessary target if one hoped to understand the nature of the solar system.

The fiscal year 1973 budget request for NASA was $3.379 billion. Congress authorized $3.444 billion and then appropriated $3.407 billion.

While there was only one new space flight project—a weather satellite—provided for in this budget, there were several continuing R & D programs and projects into which the committee looked carefully. These included Skylab, Space Shuttle, Viking, the Earth Resources Survey project, the Applications Technology Satellites, the Synchronous Meteorological Satellites, and the aeronautical research and technology programs.

Apollo 16 was launched April 16 on another successful lunar landing mission. Astronauts John Young and Charles Duke spent 71 hours on the surface of the moon and made three trips in their rover, collecting 213 pounds of lunar samples. On the return to Earth, Thomas Mattingly journeyed outside the spacecraft to retrieve the film from the scientific instrument module. Splashdown was on April 27.

Apollo 17 was the last mission in this program. Launched December 7, this mission was the most extensive one yet. Astronauts Eugene Cernan and Harrison Schmitt—the latter a geologist and the first scientist to fly on Apollo—spent 75 hours on the moon. They collected 243 pounds of samples, and Astronaut Ronald Evans retrieved the film packs during the return flight to Earth.

Apollo was over. From beginning to end, it had lasted 11½ years, cost $23.5 billion, landed 12 men on the moon, and produced a vast amount of evidence and knowledge. Technologically, it produced systems several orders of magnitude more capable than their predecessors.

In May 1972, the committee printed a staff report on "Convention on International Liability for Damage Caused by Space Objects—Analysis and Background Data." On March 29, 1972 the Convention on International Liability for Damage Caused by Space Objects was signed simultaneously in Washington, London, and Moscow.

The major concern at the Convention was that each Nation that launches or procures the launching of an object into outer space is internationally liable for any damage caused by the object or its component parts on the earth, in the air or in outer space.

The committee met June 23 to take testimony on the space agreements that had been reached with the Soviet Union, the latest one of which was signed by the President in Moscow on May 24, 1972. The purpose of this hearing was to put these agreements in perspective both with respect to our international cooperative programs in space and in our total relationship with the Soviet Union.

The space agreement that the President signed in Moscow serves several significant purposes:

It endorses the understandings reached over the past 18 months for cooperation in such important areas as space meteorology, the use of space techniques for the study of the earth's environment, the further exploration of space and the moon and the planets, and space biology and medicine.

It enables the development of compatible rendezvous and docking systems, and would subject these systems to a joint test mission in space.

It opens the possibility of more areas of cooperation of mutual interest; and it demonstrates in full view of the world that the two great powers have both the will and the capability to work together.

Congress and many government agencies were now much more interested in tangible, Earth-oriented programs in space. On July 23 ERTS 1 (Earth Resources Technology Satellite) was launched. It covers three quarters of the Earth's land surface every 18 days, affording virtually global information on such things as crop inventory and health, water storage, air and water pollution, forest fires and diseases, and recent urban population changes.

The earth resources program had another important meaning. It was a visible sign that the nature and objectives of the space program were undergoing a quiet but dramatic shift. Where the moon had been the big target during the 1960's and large and expensive programs were supported, it became increasingly clear to NASA management that the public would no longer support that kind of a space program. The key question now was, "What will this project contribute to solving everyday problems?"

93d Congress, First Session, 1973

(JANUARY 3, 1973 TO DECEMBER 22, 1973)

When the 93d Congress organized in January, Senator Frank E. Moss, Democrat of Utah, was named chairman. He succeeded Senator Clinton Anderson of New Mexico, who retired from the Senate at the end of the 92d Congress. At the same time, Senator Barry Goldwater, Republican of Arizona, became the ranking minority member.

The new Senators joining the Committee were James Abourezk, Democrat of South Dakota, Floyd Haskell, Democrat of Colorado, Dewey F. Bartlett, Republican of Oklahoma, Jesse Helms, Republican of North Carolina, and Pete V. Domenici, Republican of New Mexico.

On January 23, the organizational meeting of the Committee was held. Shortly after that, Senator Lloyd Bentsen, Democrat of Texas introduced Senate Joint Resolution 37 to designate the Manned Spacecraft Center in Houston, Texas, as the "Lyndon B. Johnson Space Center" in honor of the late President. Congress quickly passed this Resolution, and the President signed it into law in late February.

NASA's fiscal year 1974 budget request totaled $3.053 billion. Congress authorized $3.102 billion and appropriated $3.039 billion.

Skylab 1 was launched May 14. A Saturn V placed the unmanned 165,000-pound Orbital Workshop in Earth orbit. Within minutes after launch, disquieting news filtered through the telemetry reports from the Saturn V. The large, delicate meteorid shield on the outside of the Workshop had apparently been torn off by the vibrations of launch. In tearing off, it had caused serious damage to the two wings of solar cells that were to supply most of the electric power to the Workshop; one of them had sheared off, the other was snagged in the folded position. Once the Workshop was in orbit the news worsened. The loss of the big shade exposed the metal skin of the Workshop to the hot sunshine; internal temperatures soared over 100° F. This heat not only threatened habitation by astronauts, but, if prolonged, might have fogged sensitive film and generated poisonous gases.

The Committee met on May 25 to review the Skylab mission and to ask Dr. Fletcher to provide a report on the status of the mission and plans by NASA to save the mission. Dr. Fletcher testified that the launch of Skylab 2 had been postponed to May 25 so action could be completed to provide the astronauts, Charles Conrad, Joseph P. Kerwin, and Paul Weitz, with several means of repairing the spacecraft in orbit. Dr. Fletcher presented six alternatives for repair. He stated NASA was thoroughly convinced the spacecraft could be repaired by deployment of a sunshade to bring the temperature down from 120° F. to a tolerable level, and by manual deployment of the solar array to provide electrical power.

On May 25, Skylab 2 went into orbit to look at the wounded Workshop, try to fix it, and then dock with it for 28 days. Docking with the Workshop occurred on May 25. The crew entered it the next day and deployed a makeshift parasol through the solar airlock. The effect was immediate; internal temperature of the Workshop began to drop. On June 7, Astronauts Conrad and Kerwin clambered outside the Workshop and after a tense struggle succeeded in cutting the metal straps that ensnared the remaining solar wing. It slowly deployed, and electrical power poured into the storage batteries. Human ingenuity and courage had made the Workshop operational again. The remainder of Skylab 2 and the follow-on Skylab 3 and 4 were almost anticlimactic after the dramatic rescue of the Workshop.

A joint hearing by the Committee, and the House Committee on Science and Astronautics was held on July 17. The committees met to hear the Skylab 2 Astronauts upon their return to Earth from the disabled Skylab Workshop.

The Committee met on July 30, to hear the final report of the investigation team for the Skylab 1 mishap. The investigation team verified that the cause of the problems encountered with the launch of Skylab I had been the tearing away of the meteoroid shield during launch and the failure of the solar array system to fully deploy because it had been fouled by the shield. The Review Board conducted a very extensive and exhaustive investigation and ultimately issued 14 specific findings with respect to the mishap.

Dr. Fletcher testified that, "The Skylab 1 Investigation Board concluded that failure of communications among engineering personnel in various disciplines, particularly between the aerodynamics and design, was the basic cause of the design deficiencies which led to the loss of the meteoroid shield and the subsequent damage to Skylab 1."

Dr. Fletcher also stated that NASA had instituted steps toward implementing procedures to assure that a reoccurrence of this failure would not happen.

Skylab 3 was launched on July 28, completed almost 60 days in orbit, and exceeded by one third the solar observations and Earth-resources runs planned. All the medical experiments were performed. Skylab 4 (launched November 16) completed an 84-day flight with all experiments performed, as well as the additional observations of the surprise visitor, comet Kohoutek.

NASA having been in existence for 15 years, the Committee determined it was necessary to review the National Aeronautics and Space Act to determine any need for changes in the Act or within NASA to bring the government-industry relationship in line with current requirements. Hearings were held on September 26 and 27, at which representatives of the major aerospace companies in the United States presented testimony. All recommended an increased level of National Aeronautics and Space Administration appropriations to at least $3.4 billion in 1971 dollars. Many recommended more emphasis on aeronautical research by NASA.

The largest major program at that time was the Space Shuttle. The Committee met on October 30 and 31, to hear from the Administrator of NASA and representatives of the scientific and business community regarding the planned uses of the Space Shuttle. Dr. Fletcher presented the mission model of Space Shuttle payloads for the 1980's and early 1990's. He testified that the Shuttle would have four mission modes—delivery, service, retrieval and sortie. The total number of Space Shuttle flights was projected at 810, of these 572 would be NASA or DOD and 238 would be for others. Dr. Fletcher said that the payload schedule model was projecting only those requirements for Shuttle operation that would use current technology, without projecting or anticipating possible new uses resulting from future research and development.

93rd Congress, Second Session, 1974

(January 21, 1974 to December 20, 1974)

On January 24, the Committee met to review the Equal Employment Opportunity Program of NASA because it had become "clear that the NASA Equal Employment Opportunity effort over the years had been inadequate." It was the desire of the Committee to inquire carefully into the conflicting views surrounding NASA's EEO performance.

NASA officials testified that in recent years the agency had made significant progress in complying with EEO program requirements while reducing the NASA work force by nearly one-third and that it had established equal opportunity program goals.

Others testified that NASA had failed to offer equal employment opportunity to minorities and to women and that the Committee should establish annual review of the program until there was full compliance by the agency.

As a result of this hearing, the Committee required quarterly reports from NASA on the status, progress and problems of its EEO programs.

For fiscal year 1975, Congress authorized $3.267 billion for NASA, a slight increase over the $3.247 billion requested. The actual appropriation, however, was $3.207 billion.

A bill to provide for the early development and commercial demonstration of the technology of solar heating and combined solar heating and cooling systems, was introduced by Senator Moss (for himself and Senator Weicker) on November 5, 1973, and referred to the Committee. Congressman McCormack of Washington introduced a companion bill in the House of Representatives on December 10, 1973. It passed the House on February 13, 1974, was sent to the Senate, and referred to the Committee. The Committee held open hearings and later voted unanimously to report favorably a different version of the House bill. Senate and House conferees agreed on a common bill, which was passed by Congress and signed by the President on September 3.

In March 1974, the Committee issued a Committee Print on "Energy Related Research and Development," which was prepared by NASA at the request of the Committee.

This report included a compilation of summaries of individual energy-related R & D projects being conducted in Fiscal 1974, including those undertaken within the specific $2-million authorization and those which are being conducted in cooperation with other agencies under funding transfer arrangements. The report also included descriptions of programs that are an integral part of NASA work in aeronautics and space and are, at the same time, directly relevant to the generation, transmission and management of energy in non-aerospace applications.

In February, Mariner 10, which left Earth on November 3, 1973, passed Venus, gathering information that confirmed the inhospitable character of that planet. Then, using Venus' gravitational force for a boost, it flew on toward the innermost planet, Mercury. On March 29, Mariner 10 flew past Mercury, providing man a 5,000-times closer look at this desolate, crater-pocked, Sun-seared planet than had been possible from Earth. Mariner 10 flew out in a large elliptical orbit, circled back by Mercury a second time on September 21.

On March 11 and 21, joint hearings were held with the Commerce Committee on a bill to establish a science adviser to the President. The principal witness was Dr. H. Guyford Stever, Director of the National Science Foundation. Dr. Stever testified that there was a need for a scientific adviser to the President. Other witnesses agreed with that testimony but disagreed with the form of the bill and felt that it should be rewritten.

The Senate passed a different bill on October 11, and sent it to the House. No further action was taken on the bill during the 93d Congress.

The Committee met July 16 and 18 to review the state of aeronautical research and development. The principal interest of the Committee was in regard to long-term predictions for advanced aviation and aeronautical research, development and production. Leading experts from both civilian companies and government agencies testified. Most of the witnesses concentrated on research to obtain greater aircraft efficiency through air frame design, engine modification, or improved fuels. Dr. Robert Cannon, Assistant Secretary of Transportation for Systems Development and Technology, testified that DOT was actively pursuing improved ground support systems, including airport and air traffic management. Dr. Fletcher stated that NASA was actively planning new research on improved fuel efficiency and consumption through use of hydrogen fuels, mammoth future transport aircraft, including the flying wing, new aircraft design, such as the oblique wing concept, and advanced propulsion and engine concepts such as the ramjet engine. The Navy is actively engaged in research and development of very large lighter-than-aircraft, which would provide maximum crane or airlift capabilities.

On July 23, the Committee held hearings on a bill to authorize a seventh Applications Satellite. Witnesses for NASA and HEW expressed opposition to the bill and stated that budget constraints would not allow future research and development by NASA or HEW in satellite communications. They also stated that private industry should be able to carry out the intent of the bill. Witnesses from the Public Broadcasting System and the Federation of Rocky Mountain States strongly supported the bill as users of satellite communications and urged a favorable report. No further action was taken on the bill.

Senator Moss introduced a bill on August 3, 1973, to provide for the coordinated application of technology to civilian needs in the area of earth resources survey systems and to establish within the National Aeronautics and Space Administration an Office of Earth Resources Survey Systems. Senator Abourezk introduced a bill on May 13, 1974 to establish within the Department of Interior the Earth Resources Observation Administration.

Open hearings were held on both bills on August 6, 8, and 9 and September 18, 1974. Witnesses supported continuation of the Earth Resources Technology Satellite Survey Program (ERTS) on an experimental basis but expressed opposition to any portion of the bills that would create an operational program within the Department of Interior or NASA. All witnesses favored continuing research in the ERTS program.

94TH CONGRESS, FIRST SESSION, 1975

(JANUARY 14 TO DECEMBER 19)

During the organization of the 94th Congress, Senators Magnuson, Abourezk, Haskell, Curtis, Weicker, Bartlett and Helms resigned from the Committee. The Senate also reduced the Committee's membership from 14 to 10—six Democrats and four Republicans. New Senators joining the Committee were Wendell H. Ford, Democrat of Kentucky, Dale Bumpers, Democrat of Arkansas, Paul Laxalt, Republican of Nevada, and Jake Garn, Republican of Utah.

For fiscal year 1976, NASA requested $3,539,000,000 for the 12-month period and $958,900,000 for the three-month Transition Quarter. The latter period was a one-time adjustment in the federal government's fiscal year to accommodate the shift in the beginning of the fiscal year from July 1 back to October 1. The Transition Quarter covered the period from July 1, 1976 to September 30, 1976. Congress authorized a total of $3,562,310,000 for the year and $925,150,000 for the Transition Quarter. The actual appropriation was almost the same—$3,535,022,000 and $925,028,000, respectively.

Even before the annual authorization hearings started, the Committee held a hearing in late January on how NASA's expertise could be applied to increasing our knowledge of the earth's upper atmosphere. This hearing was stimulated by recent scientific reports indicating the ozone in the upper atmosphere that protects us from ultraviolet radiation is being depleted. As a result of this hearing and staff investigations, the Committee added a provision to the fiscal year 1976 authorization bill directing NASA to undertake a program of upper atmospheric research and adding $7 million to the authorization request for this purpose. The Committee's amendment to the authorization bill was accepted by the Senate and the House and became law.

In the summer, the Committee established an ad hoc Subcommittee on the Upper Atmosphere, chaired by Senator Bumpers, to monitor and oversee developments in this area. The Subcommittee held seven days of hearings in September to acquire as much information as possible about the increasingly controversial subject of stratospheric ozone depletion and possible federal and international regulations to halt it.

The Committee also established another ad hoc subcommittee, the Subcommittee on Aerospace Technology and National Needs, which was chaired by Senator Ford. This Subcommittee held three days of hearings on NASA's technology utilization program, in September and, as a result, made several recommendations for improving the program to transfer NASA-developed technology to the private sector of the economy.

The full Committee held three days of hearings in the fall to examine NASA's aircraft fuel-efficiency program. This program was developed by the agency at the request of Senators Moss and Goldwater. The request grew out of a Committee staff study to determine how NASA's resources and expertise could be best applied to solving critical national problems. The study showed that NASA should be applying more effort toward developing the technology for a new commercial airline transport that would be as much as 50 percent more efficient in fuel usage.

NASA developed a phased approach that would make the best use of its limited resources in developing the necessary technology. Details of the plan and its estimated costs were presented at the first hearing. In the later hearings, representatives of aircraft and engine manufacturers, the airlines and aerospace groups testified to the need for and feasibility of the NASA program if the U.S. is to retain its position of world leadership in commercial aviation in the face of increasing competition from abroad.

Near the end of the Session, the Committee held joint hearings with the Committees on Commerce and on Labor and Public Welfare on several bills to establish the position of science adviser to the President. The Committee had been working on legislation in this area ever since the position of presidential science adviser was abolished by the President in January, 1973. A renewed effort to establish this important position in law got under way in May, 1975 when Senator Moss, the Committee chairman, and Rep. Olin E. Teague, Democrat of Texas and chairman of the House Committee on Science and Technology, met with the President. In early November, the House passed a bill (H.R. 10230) creating the post of science adviser and sent it to the Senate for consideration.

94th Congress, Second Session, 1976

(JANUARY 19 TO OCTOBER 1)

Late in January, agreement was reached on the text of a bill to establish national policies and priorities for science and technology, and the Senate passed this measure on February 4. However, the House disagreed with the Senate legislation and requested a conference. The conference met on April 1. The conferees issued their report on April 26, and the Senate agreed to the compromise bill the next day. The House agreed on April 29. The bill establishing the post of presidential science adviser was signed by the President on May 11 and became Public Law 94–282.

NASA's budget request for fiscal year 1977 totaled $3,697,000,000 and included the first increment of funds for the aircraft fuel-efficiency program that the Committee in 1975 urged the agency to undertake. Congress later authorized $3,695,170,000. The actual appropriation was $3,692,515,000.

The two ad hoc subcommittees continued to be active in 1976. The Subcommittee on the Upper Atmosphere had a public hearing in February to review NASA's plan for a program in upper atmospheric research and in March to obtain the latest scientific information on the effects of reduced ozone on the Earth's living systems, weather and climate. In December, after Congress had adjourned, the Subcommittee heard from the federal regulatory agencies about what rules they plan to limit aerosol cans using chlorofluorocarbons for propellants.

The Subcommittee on Aerospace Technology and National Needs held several hearings to explore future uses of space. These uses include the possibility of building large satellites in space to generate electricity and transmit it safely and economically to Earth, and using the weightless environment of space for medical and biological research and for processing of materials in ways that can not be done on Earth. In September, the Subcommittee began hearings on the development of alternate fuels for aircraft engines. The emphasis was on the prospects for developing aviation fuels from coal or oil shale through both military and civilian research so that civilian and military aircraft will have adequate fuel in the future as petroleum reserves decline.

A major effort of the Committee in the Second Session was developing legislation to establish an operational earth resources information system. The Committee had become increasingly concerned for several years that no operational successor was being developed for the experimental series of Landsat earth resources satellites. In 1974, the Committee was the driving force in securing funding for the third Landsat, which is due to be launched in 1977. Legislation introduced by Senators Moss and Ford in late August would establish an operational system that would include a space segment operated by NASA and a ground data-handling segment operated by a private company or group of companies. The two Senators emphasized that this legislation would be just a starting point and that there would be extensive consultations with users of earth resources data, particularly the states, private companies and government agencies, before final legislation could be drafted.

The Committee also acted this year on two presidential nominations referred to it. In June 21, the President nominated Dr. Alan M. Lovelace to be Deputy Administrator of NASA, succeeding Dr. George M. Low who retired in April. Dr. Lovelace appeared in his behalf at a public hearing on June 25. The Committee recommended the nomination be confirmed and the Senate did so later that day. Dr. H. Guyford Stever, Director of the National Science Foundation, was nominated July 21 to be Director of the Office of Science and Technology Policy, the presidential science adviser post established by the law enacted in May. The Committee, together with the Committees on Commerce and on Labor and Public Welfare, held a joint hearing July 28 and recommended Dr. Stever be confirmed. The Senate did so on August 9.

In September the Committee published Soviet Space Programs, 1971–75, a two-volume study prepared by experts at the Library of Congress. This study, the definitive one on the Soviet space program that is freely available, updates earlier ones that also were prepared for the Committee by the Library.

3. MEMBERSHIP LIST

(a) Committee Chairman

Senator Lyndon B. Johnson [1]	August 24, 1958–January 3, 1961
Senator Robert S. Kerr [2]	January 10, 1961–January 1, 1963 [3]
Senator Clinton P. Anderson	February 25, 1963–January 2, 1973
Senator Frank E. Moss	January 4, 1973–January 3, 1977

(b) By Congress and Session

SPECIAL COMMITTEE ON SPACE AND ASTRONAUTICS

(Created February 6, 1958 pursuant to Senate Resolution 256)

85th Congress, Second Session, 1958

JANUARY 7, 1958, TO AUGUST 24, 1958

(Committee, 13 Members; 7 Democrats and 6 Republicans)

LYNDON B. JOHNSON, Texas, *Chairman*

RICHARD B. RUSSELL, Georgia
THEODORE FRANCIS GREEN, Rhode Island
JOHN L. McCLELLAN, Arkansas
WARREN G. MAGNUSON, Washington
CLINTON P. ANDERSON, New Mexico
STUART SYMINGTON, Missouri

STYLES BRIDGES, New Hampshire
ALEXANDER WILEY, Wisconsin
BOURKE B. HICKENLOOPER, Iowa
LEVERETT SALTONSTALL, Massachusetts
JOHN W. BRICKER, Ohio
KARL E. MUNDT, South Dakota

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[1] Senator Johnson was also chairman of the Special Committee on Space and Astronautics. Resigned chairmanship of the Senate Committee on Aeronautical and Space Sciences upon election as Vice President.

[2] Deceased.

[3] Senator Richard B. Russell was acting chairman following death of Senator Kerr and until Senator Anderson's election as chairman.

COMMITTEE ON AERONAUTICAL AND SPACE SCIENCES[1]

(Created pursuant to Senate Resolution 327, July 24, 1958)

85TH CONGRESS, SECOND SESSION

JANUARY 7, 1958, TO AUGUST 24, 1958

(Committee, 15 Members; 8 Democrats and 7 Republicans)

LYNDON B. JOHNSON, Texas, *Chairman*

CARL HAYDEN, Arizona
RICHARD B. RUSSELL, Georgia
THEODORE FRANCIS GREEN, Rhode Island
WARREN G. MAGNUSON, Washington
CLINTON P. ANDERSON, New Mexico
ROBERT S. KERR, Oklahoma
STUART SYMINGTON, Missouri

STYLES BRIDGES, New Hampshire
ALEXANDER WILEY, Wisconsin
BOURKE, B. HICKENLOOPER, Iowa
LEVERETT SALTONSTALL, Massachusetts
JOHN W. BRICKER, Ohio
MARGARET CHASE SMITH, Maine
JACOB K. JAVITS, New York

86TH CONGRESS, FIRST SESSION, 1959

JANUARY 7, 1959, TO SEPTEMBER 15, 1959

(Committee, 15 Members; 10 Democrats and 5 Republicans)[2]

Appointed August 24, 1958

LYNDON B. JOHNSON, Texas, *Chairman*
RICHARD B. RUSSELL, Georgia
WARREN G. MAGNUSON, Washington
CLINTON P. ANDERSON, New Mexico
ROBERT S. KERR, Oklahoma
STUART SYMINGTON, Missouri

Appointed January 14, 1959

JOHN STENNIS, Mississippi
STEPHEN M. YOUNG, Ohio
THOMAS J. DODD, Connecticut
HOWARD W. CANNON, Nevada

Appointed August 24, 1958

STYLES BRIDGES, New Hampshire
ALEXANDER WILEY, Wisconsin
MARGARET CHASE SMITH, Maine

Appointed January 20, 1959

THOS. E. MARTIN, Iowa
CLIFFORD P. CASE, New Jersey

86TH CONGRESS, SECOND SESSION, 1960

JANUARY 6, 1960, TO SEPTEMBER 1, 1960

(Committee, 15 Members; 10 Democrats and 5 Republicans)

Appointed August 24, 1958

LYNDON B. JOHNSON, Texas, *Chairman*
RICHARD B. RUSSELL, Georgia
WARREN G. MAGNUSON, Washington
CLINTON P. ANDERSON, New Mexico
ROBERT S. KERR, Oklahoma
STUART SYMINGTON, Missouri

Appointed January 14, 1959

JOHN STENNIS, Mississippi
STEPHEN M. YOUNG, Ohio
THOMAS J. DODD, Connecticut
HOWARD W. CANNON, Nevada

Appointed August 24, 1958

STYLES BRIDGES, New Hampshire
ALEXANDER WILEY, Wisconsin[4]
MARGARET CHASE SMITH, Maine

Appointed January 20, 1959

THOS. E. MARTIN, Iowa
CLIFFORD P. CASE, New Jersey

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[1] Established as the new Senate standing committee whose members were appointed on Aug. 24, 1958.

[2] Ratio of party membership changed as a result of the November 1958 election. The Democrats gained two seats and the Republicans lost two seats on the committee.

87th Congress, First Session, 1961

JANUARY 3, 1961, TO SEPTEMBER 27, 1961

(Committee, 15 Members; 10 Democrats and 5 Republicans)

Appointed August 24, 1958

ROBERT S. KERR, Oklahoma, *Chairman*[1]
RICHARD B. RUSSELL, Georgia
WARREN G. MAGNUSON, Washington
CLINTON P. ANDERSON, New Mexico
STUART SYMINGTON, Missouri

Appointed January 14, 1959

JOHN STENNIS, Mississippi
STEPHEN M. YOUNG, Ohio
THOMAS J. DODD, Connecticut
HOWARD W. CANNON, Nevada

Appointed January 11, 1961

SPESSARD L. HOLLAND, Florida

Appointed August 24, 1958

STYLES BRIDGES, New Hampshire[2]
ALEXANDER WILEY, Wisconsin
MARGARET CHASE SMITH, Maine

Appointed January 20, 1959

CLIFFORD P. CASE, New Jersey

Appointed January 13, 1961

BOURKE B. HICKENLOOPER, Iowa[3]

87th Congress, Second Session, 1962

JANUARY 10, 1962, TO OCTOBER 13, 1962

(Committee, 15 Members; 10 Democrats and 5 Republicans)

Appointed August 24, 1958

ROBERT S. KERR, Oklahoma, *Chairman*
RICHARD B. RUSSELL, Georgia
WARREN G. MAGNUSON, Washington
CLINTON P. ANDERSON, New Mexico
STUART SYMINGTON, Missouri

Appointed January 14, 1959

JOHN STENNIS, Mississippi
STEPHEN M. YOUNG, Ohio
THOMAS P. DODD, Connecticut
HOWARD W. CANNON, Nevada

Appointed January 11, 1961

SPESSARD L. HOLLAND, Florida

Appointed August 24, 1958

ALEXANDER WILEY, Wisconsin[4]
MARGARET CHASE SMITH, Maine

Appointed January 20, 1959

CLIFFORD P. CASE, New Jersey

Appointed January 13, 1961

BOURKE B. HICKENLOOPER, Iowa

Appointed February 2, 1962

HOMER E. CAPEHART, Indiana[5]

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[1] Became chairman on January 10, 1961 following the resignation on January 3, 1961, of Senator Lyndon B. Johnson who had been elected Vice President.

[2] Died on November 26, 1961.

[3] Also served from August 24, 1958 to January 20, 1959.

[4] Left the Senate at the end of the second session, 87th Congress.

[5] *Ibid.*

88th Congress, First Session, 1963

JANUARY 9, 1963, TO DECEMBER 30, 1963[1]

(Committee, 15 Members; 10 Democrats and 5 Republicans)

Appointed August 24, 1958

CLINTON P. ANDERSON, New Mexico, *Chairman*[2]
RICHARD B. RUSSELL, Georgia[3]
WARREN G. MAGNUSON, Washington
STUART SYMINGTON, Missouri

Appointed January 14, 1959

JOHN STENNIS, Mississippi
STEPHEN M. YOUNG, Ohio
THOMAS J. DODD, Connecticut
HOWARD W. CANNON, Nevada

Appointed January 11, 1961

SPESSARD L. HOLLAND, Florida

Appointed February 25, 1963

J. HOWARD EDMONDSON, Oklahoma

Appointed August 24, 1958

MARGARET CHASE SMITH, Maine

Appointed January 20, 1959

CLIFFORD P. CASE, New Jersey

Appointed January 13, 1961

BOURKE B. HICKENLOOPER, Iowa

Appointed February 25, 1963

CARL CURTIS, Nebraska
KENNETH B. KEATING, New York

88th Congress, Second Session, 1964

JANUARY 7, 1964, TO OCTOBER 3, 1964

(Committee, 15 Members; 10 Democrats and 5 Republicans)

Appointed August 24, 1958

CLINTON P. ANDERSON, New Mexico, *Chairman*
RICHARD B. RUSSELL, Georgia
WARREN G. MAGNUSON, Washington
STUART SYMINGTON, Missouri

Appointed January 14, 1959

JOHN STENNIS, Mississippi
STEPHEN M. YOUNG, Ohio
THOMAS J. DODD, Connecticut
HOWARD W. CANNON, Nevada

Appointed January 11, 1961

SPESSARD L. HOLLAND, Florida

Appointed February 25, 1963

J. HOWARD EDMONDSON, Oklahoma[2]

Appointed August 24, 1958

MARGARET CHASE SMITH, Maine

Appointed January 20, 1959[4]

CLIFFORD P. CASE, New Jersey

Appointed January 13, 1961

BOURKE B. HICKENLOOPER, Iowa

Appointed February 25, 1963

CARL CURTIS, Nebraska
KENNETH B. KEATING, New York[5]

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[1] February 25, 1963: Pursuant to Senate amendment to Rule 25, S. Res. 88–90, the Committee was designated a major committee of the Senate. Prior to that time it had been designated a minor committee on which Senators could serve on a third committee assignment. The "Grandfather clause" applies in the case of Senators who were members of the committee prior to the above-mentioned date.

[2] Became Chairman on February 25, 1963.

[3] Acting Chairman from January 1, 1963, until February 25, 1963, between the death of Senator Kerr on January 1, 1963, and Senator Anderson's appointment as Chairman.

[4] Resigned to take another committee assinement, January 15, 1965.

[5] Left the Senate at the end of the 88th Congress.

89th Congress, First Session, 1965

JANUARY 4, 1965, TO OCTOBER 23, 1965

(Committee, 16 Members;[1] 11 Democrats and 5 Republicans)

Appointed August 24, 1958

CLINTON P. ANDERSON, New Mexico, *Chairman*
RICHARD B. RUSSELL, Georgia
WARREN G. MAGNUSON, Washington
STUART SYMINGTON, Missouri

Appointed January 14, 1959

JOHN STENNIS, Mississippi
STEPHEN M. YOUNG, Ohio
THOMAS J. DODD, Connecticut
HOWARD W. CANNON, Nevada

Appointed January 11, 1961

SPESSARD L. HOLLAND, Florida

Appointed January 8, 1965

WALTER F. MONDALE, Minnesota
JOSEPH D. TYDINGS, Maryland[2]

Appointed August 24, 1958

MARGARET CHASE SMITH, Maine

Appointed January 13, 1961

BOURKE B. HICKENLOOPER, Iowa

Appointed February 25, 1963

CARL CURTIS, Nebraska

Appointed January 15, 1965

LEN B. JORDAN, Idaho
GEORGE D. AIKEN, Vermont

89th Congress, Second Session, 1966

JANUARY 10, 1966, TO OCTOBER 22, 1966

(Committee, 16 Members; 11 Democrats and 5 Republicans)

Appointed August 24, 1958

CLINTON P. ANDERSON, New Mexico, *Chairman*
RICHARD B. RUSSELL, Georgia
WARREN G. MAGNUSON, Washington
STUART SYMINGTON, Missouri

Appointed Jandary 14, 1959

JOHN STENNIS, Mississippi
STEPHEN M. YOUNG, Ohio
THOMAS J. DODD, Connecticut
HOWARD W. CANNON, Nevada

Appointed January 11, 1961

SPESSARD L. HOLLAND, Florida

Appointed January 8, 1965

WALTER F. MONDALE, Minnesota

Appointed January 14, 1966

HARRY F. BYRD, Jr., Virginia

Appointed August 24, 1958

MARGARET CHASE SMITH, Maine

Appointed January 13, 1961

BOURKE B. HICKENLOOPER, Iowa

Appointed February 25, 1963

CARL CURTIS, Nebraska

Appointed January 15, 1965

LEN B. JORDAN, Idaho
GEORGE D. AIKEN, Vermont[3]

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[1] January 8, 1965: By Senate Resolution 89–18 the Senate enlarged the composition of the Committee on Aeronautical and Space Sciences from 15 members to 16 members.

[2] Resigned to take another committee assignment January 14, 1966.

[3] Resigned January 14, 1967, to take another committee assignment.

90th Congress, First Session, 1967

JANUARY 10, 1967, TO DECEMBER 15, 1967

(Committee, 16 Members; 10 Democrats and 6 Republicans)[1]

Appointed August 24, 1958

CLINTON P. ANDERSON, New Mexico, *Chairman*
RICHARD B. RUSSELL, Georgia
WARREN G. MAGNUSON, Washington
STUART SYMINGTON, Missouri

Appointed January 14, 1959

JOHN STENNIS, Mississippi
STEPHEN M. YOUNG, Ohio
THOMAS J. DODD, Connecticut
HOWARD W. CANNON, Nevada

Apointed January 11, 1961

SPESSARD L. HOLLAND, Florida

Appointed January 8, 1965

WALTER F. MONDALE, Minnesota

Appointed August 24, 1958

MARGARET CHASE SMITH, Maine

Appointed January 13, 1961

BOURKE B. HICKENLOOPER, Iowa

Appointed February 25, 1963

CARL CURTIS, Nebraska

Appointed January 15, 1965

LEN B. JORDAN, Idaho

Appointed January 14, 1967

EDWARD W. BROOKE, Massachusetts
CHARLES H. PERCY, Illinois

90th Congress, Second Session, 1968

JANUARY 15, 1968, TO OCTOBER 14, 1968

(Committee, 16 Members; 10 Democrats and 6 Republicans)

Appointed August 24, 1958

CLINTON P. ANDERSON, New Mexico, *Chairman*
RICHARD B. RUSSELL, Georgia
WARREN G. MAGNUSON, Washington
STUART SYMINGTON, Missouri

Appointed January 14, 1959

JOHN STENNIS, Mississippi
STEPHEN D. YOUNG, Ohio
THOMAS J. DODD, Connecticut
HOWARD W. CANNON, Nevada

Appointed January 11, 1961

SPESSARD L. HOLLAND, Florida

Appointed January 8, 1965

WALTER F. MONDALE, Minnesota[2]

Appointed August 24, 1958

MARGARET CHASE SMITH, Maine

Appointed January 13, 1961

BOURKE B. HICKENLOOPER, Iowa

Appointed February 25, 1963

CARL CURTIS, Nebraska

Appointed January 15, 1965

LEN B. JORDAN, Idaho

Appointed January 14, 1967

EDWARD W. BROOKS, Massachusetts[3]
CHARLES H. PERCY, Illinois[3]

Appointed September 12, 1968

MARK O. HATFIELD, Oregon
CHARLES E. GOODELL, New York

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[1] Ratio of party membership changed as a result of the November 1966 election. The Democrats lost one seat and the Republicans gained one seat on the committee.

[2] Resigned to take another committee assignment, June 25, 1968.

[3] Resigned to take another committee assignment, Sept. 12, 1968.

91st Congress, First Session, 1969

JANUARY 3, 1969, TO DECEMBER 23, 1969

(Committee, 16 Members; 9 Democrats and 7 Republicans)

Appointed August 24, 1958

CLINTON P. ANDERSON, New Mexico, *Chairman*
RICHARD B. RUSSELL, Georgia
WARREN G. MAGNUSON, Washington
STUART SYMINGTON, Missouri

Appointed January 14, 1959

JOHN STENNIS, Mississippi
STEPHEN M. YOUNG, Ohio
THOMAS J. DODD, Connecticut
HOWARD W. CANNON, Nevada

Appointed January 11, 1961

SPESSARD L. HOLLAND, Florida

Appointed August 24, 1958

MARGARET CHASE SMITH, Maine

Appointed February 25, 1963

CARL T. CURTIS, Nebraska

Appointed September 12, 1968

MARK O. HATFIELD, Oregon

Appointed January 14, 1969

BARRY M. GOLDWATER, Arizona
CHARLES McC. MATHIAS, Jr., Maryland[1]
WILLIAM B. SAXBE, Ohio

Appointed September 18, 1969

RALPH T. SMITH, Illinois

91st Congress, Second Session, 1970

JANUARY 19, 1970, TO JANUARY 2, 1971

(Committee, 16 Members; 10 Democrats and 6 Republicans)

Appointed August 24, 1958

CLINTON P. ANDERSON, New Mexico, *Chairman*
RICHARD B. RUSSELL, Georgia
WARREN G. MAGNUSON, Washington
STUART SYMINGTON, Missouri

Appointed January 14, 1959

JOHN STENNIS, Mississippi
STEPHEN M. YOUNG, Ohio
THOMAS J. DODD, Connecticut
HOWARD W. CANNON, Nevada

Appointed January 11, 1961

SPESSARD L. HOLLAND, Florida

Appointed November 17, 1970

ADLAI E. STEVENSON III, Illinois

Appointed August 24, 1958

MARGARET CHASE SMITH, Maine

Appointed February 25, 1963

CARL T. CURTIS, Nebraska

Appointed September 12, 1968

MARK O. HATFIELD, Oregon

Appointed January 14, 1969

BARRY M. GOLDWATER, Arizona
WILLIAM B. SAXBE, Ohio

Appointed September 18, 1969

RALPH T. SMITH, Illinois[2]

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[1] Left the Committee September 18, 1969.

[2] Retired from the Senate, November 3, 1970.

92d Congress, First Session, 1971

JANUARY 21, 1971, TO DECEMBER 17, 1971

(Committee, 10 Members; 6 Democrats and 4 Republicans)

Appointed August 24, 1958

CLINTON P. ANDERSON, New Mexico, *Chairman*
WARREN G. MAGNUSON, Washington
STUART SYMINGTON, Missouri

Appointed January 14, 1959

JOHN STENNIS, Mississippi
HOWARD W. CANNON, Nevada

Appointed February 2, 1971

DAVID H. GAMBRELL, Georgia

Appointed February 25, 1963

CARL T. CURTIS, Nebraska

Appointed August 24, 1958

MARGARET CHASE SMITH, Maine

Appointed January 14, 1969

BARRY M. GOLDWATER, Arizona

Appointed January 29, 1971

LOWELL P. WEICKER, Jr., Connecticut

92nd Congress, Second Session, 1972

JANUARY 18, 1972, TO OCTOBER 18, 1972

(Committee, 10 Members; 5 Democrats and 5 Republicans)

Appointed August 24, 1958

CLINTON P. ANDERSON, New Mexico *Chairman*
WARREN G. MAGNUSON, Washington
STUART SYMINGTON, Missouri

Appointed January 14, 1959

JOHN STENNIS, Mississippi
HOWARD W. CANNON, Nevada

Appointed February 25, 1963

CARL T. CURTIS, Nebraska

Appointed August 24, 1958

MARGARET CHASE SMITH, Maine

Appointed January 14, 1969

BARRY M. GOLDWATER, Arizona

Appointed January 29, 1971

LOWELL P. WEICKER, Jr., Connecticut

Appointed February 23, 1972

KARL MUNDT, South Dakota

Senator Richard B. Russell, August 24, 1958–January 21, 1971—Deceased.

Senator Stephen M. Young, January 14, 1959–January 2, 1971—Retired from Senate.

Senator Thomas A. Dodd, January 14, 1959–January 2, 1971—Left the Senate.

Senator Spessard L. Holland, January 11, 1961–January 2, 1971—Retired from the Senate.

Senator Adlai E. Stevenson, November 17, 1970–January 28, 1971—Took another committee assignment.

Senator Mark Hatfield, September 12, 1968–January 29, 1971—Took another committee assignment.

Senator William B. Saxbe, January 14, 1969–January 29, 1971—Took another committee assignment.

Senator James L. Buckley, January 29, 1971–February 23, 1972—Took another committee assignment.

Senator David H. Gambrell, February 2, 1971–November 8, 1972—Left the Senate.

93d Congress, First Session, 1973

JANUARY 3, 1973, TO DECEMBER 22, 1973

(Committee, 13 Members; 7 Democrats and 6 Republicans)

Appointed January 4, 1973

FRANK E. MOSS, Utah, *Chairman*

Appointed August 24, 1958

WARREN G. MAGNUSON, Washington
STUART SYMINGTON, Missouri

Appointed January 14, 1959

JOHN STENNIS, Mississippi
HOWARD W. CANNON, Nevada

Appointed January 4, 1973

JAMES ABOUREZK, South Dakota
FLOYD K. HASKELL, Colorado

Appointed January 14, 1969

BARRY M. GOLDWATER, Arizona

Appointed February 25, 1963

CARL T. CURTIS, Nebraska

Appointed January 29, 1971

LOWELL P. WEICKER, Jr., Connecticut

Appointed January 12, 1973

DEWEY F. BARTLETT, Oklahoma
JESSE HELMS, North Carolina
PETE V. DOMENICI, New Mexico

93d Congress, Second Session, 1974

JANUARY 21, 1974, TO DECEMBER 20, 1974

(Committee, 14 Members; 8 Democrats and 6 Republicans)

Appointed January 4, 1973

FRANK E. MOSS, Utah, *Chairman*

Appointed August 24, 1958

WARREN G. MAGNUSON, Washington
STUART SYMINGTON, Missouri

Appointed January 14, 1959

JOHN STENNIS, Mississippi
HOWARD W. CANNON, Nevada

Appointed January 4, 1973

JAMES ABOUREZK, South Dakota
FLOYD HASKELL, Colorado

Appointed January 23, 1974

HOWARD M. METZENBAUM, Ohio[1]

Appointed January 14, 1969

BARRY M. GOLDWATER, Arizona

Appointed February 25, 1963

CARL T. CURTIS, Nebraska

Appointed January 29, 1971

LOWELL P. WEICKER, Jr., Connecticut

Appointed January 12, 1973

DEWEY F. BARTLETT, Oklahoma
JESSE HELMS, North Carolina
PETE V. DOMENICI, New Mexico

Senator Clinton P. Anderson, August 24, 1958–January 2, 1973—Retired from the Senate.
Senator Margaret Chase Smith, August 24, 1958–January 2, 1973—Left the Senate.
Senator Karl Mundt, February 23, 1972–January 2, 1973—Retired from the Senate.
[1] Left the Senate December 22, 1974.

94th Congress, First Session, 1975

JANUARY 14, 1975, TO DECEMBER 19, 1975

(Committee, 10 Members; 6 Democrats, 4 Republicans)

Appointed January 4, 1973

FRANK E. MOSS, Utah, *Chairman*

Appointed August 24, 1958

STUART SYMINGTON, Missouri

Appointed January 14, 1959

JOHN STENNIS, Mississippi
HOWARD W. CANNON, Nevada

Appointed January 17, 1975

WENDELL H. FORD, Kentucky
DALE BUMPERS, Arkansas

Appointed January 14, 1969

BARRY M. GOLDWATER, Arizona

Appointed January 12, 1973

PETE V. DOMENICI, New Mexico

Appointed January 23, 1975

PAUL LAXALT, Nevada
JAKE GARN, Utah

Appointed September 3, 1975

NORRIS COTTON, New Hampshire[1]

94th Congress, Second Session, 1976

JANUARY 19, 1976, TO OCTOBER 1, 1976

(Committee, 10 Members; 6 Democrats, 4 Republicans)

(*Appointed January 4, 1973*)

FRANK E. MOSS, Utah, *Chairman*

Appointed August 24, 1958

STUART SYMINGTON, Missouri

Appointed January 14, 1959

JOHN STENNIS, Mississippi
HOWARD W. CANNON, Nevada

Appointed January 17, 1975

WENDELL H. FORD, Kentucky
DALE BUMPERS, Arkansas

Appointed January 14, 1969

BARRY M. GOLDWATER, Arizona

Appointed January 12, 1973

PETE V. DOMENICI, New Mexico

Appointed January 23, 1975

PAUL LAXALT, Nevada
JAKE GARN, Utah

Subcommittee on the Upper Atmosphere

DALE BUMPERS, *Chairman*

STUART SYMINGTON
FRANK E. MOSS, *Ex Officio*

PETE V. DOMENICI
BARRY M. GOLDWATER, *Ex Officio*

James J. Gehrig, *Counsel*

Subcommittee on Aerospace Technology and National Needs

WENDELL H. FORD, *Chairman*

JOHN C. STENNIS
HOWARD W. CANNON
FRANK E. MOSS, *Ex Officio*

PAUL LAXALT
JAKE GARN
BARRY M. GOLDWATER, *Ex Officio*

James T. Bruce, *Counsel*

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[1] Left the Senate September 19, 1975.

(c) Alphabetical Listing of Members of the Committee as of 1976

(Including State and Service on Committee)

Name	State	Service on Committee
	A	
Abourezk, James	South Dakota	January 4, 1973– January 17, 1975
Aiken, George D.[1]	Vermont	January 15, 1965– January 14, 1967
Anderson, Clinton P.[2] [3]	New Mexico	August 24, 1958– January 2, 1973
	B	
Bartlett, Dewey F	Oklahoma	January 12, 1973– January 17, 1975
Bricker, John W.[3] [4]	Ohio	August 24, 1958– January 7, 1959
Bridges, Styles [3] [5]	New Hampshire	August 24, 1958– November 26, 1961
Brooke, Edward W.[1]	Massachusetts	January 14, 1967– September 12, 1968
Buckley, James L	New York	January 29, 1971– February 23, 1972
Bumpers, Dale	Arkansas	January 17, 1975–
Byrd, Jr., Harry F.[1]	Virginia	January 14, 1966– January 11, 1967
	C	
Cannon, Howard W	Nevada	January 14, 1959–
Capehart, Homer E.[4]	Indiana	February 2, 1962– January 3, 1963
Case, Clifford P.[1]	New Jersey	January 20, 1959– January 15, 1965
Cotton, Norris	New Hampshire	September 3, 1975– September 19, 1975
Curtis, Carl	Nebraska	February 25, 1963– January 17, 1975
	D	
Dodd, Thomas J	Connecticut	January 14, 1959– January 2, 1971
Domenici, Pete V	New Mexico	January 12, 1973–
	E	
Edmondson, J. Howard [4]	Oklahoma	February 25, 1963– November 4, 1964
	F	
Ford, Wendell H	Kentucky	January 17, 1975–
	G	
Gambrell, David H	Georgia	February 2, 1971– November 8, 1972
Garn, Jake	Utah	January 23, 1975–
Goldwater, Barry M	Arizona	January 14, 1969–
Goodell, Charles E	New York	September 12, 1968– January 2, 1959
Green, Theodore Francis [1] [3]	Rhode Island	August 24, 1958– January 14, 1959

Footnotes at end of table, p. 71.

Name	State	Service on Committee
H		
Haskell, Floyd K	Colorado	January 4, 1973–January 17, 1975
Hatfield, Mark O	Oregon	September 12, 1968–January 29, 1971
Hayden, Carl [1]	Arizona	August 24, 1958–January 14, 1959
Helms, Jesse	North Carolina	January 12, 1973–January 17, 1975
Hickenlooper, Bourke B.[3] [6]	Iowa	August 24, 1958–January 20, 1959 and January 13, 1961–
Holland, Spessard L	Florida	January 11, 1961–January 2, 1971
J		
Javits, Jacob K.[1]	New York	August 24, 1958–January 20, 1959
Johnson, Lyndon B.[7] [8]	Texas	August 24, 1958–January 3, 1961
Jordan, Len B	Idaho	January 15, 1965–January 14, 1969
K		
Keating, Kenneth B.[4]	New York	February 25, 1963–January 3, 1965
Kerr, Robert S.[9] [10]	Oklahoma	August 24, 1958–January 1, 1963
L		
Laxalt, Paul	Nevada	January 23, 1975–
M		
Magnuson, Warren G.[3]	Washington	August 24, 1958–January 17, 1975
Martin, Thos. E.[4]	Iowa	January 20, 1959–January 3, 1961
Mathias, Charles McC., Jr	Maryland	January 14, 1969–September 18, 1969
McClellan, John L.[11]	Arkansas	February 10, 1958–August 24, 1958
Metzenbaum, Howard M	Ohio	January 23, 1974–December 22, 1974
Mondale, Walter F.[1]	Minnesota	January 8, 1965–June 25, 1968
Moss, Frank E	Utah	January 4, 1973–January 3, 1977
Mundt, Karl E.[12]	South Dakota	February 10, 1958–August 24, 1958 and February 23, 1972–January 2, 1973
P		
Percy, Charles H.[1]	Illinois	January 14, 1967–September 12, 1968
R		
Russell, Richard B.[3] [12]	Georgia	August 24, 1958–January 21, 1971
S		
Saltonstall, Leverett [1] [3]	Massachusetts	August 24, 1958–January 20, 1959
Saxbe, William B	Ohio	January 14, 1969–January 29, 1971

Footnotes at end of table, p. 71.

Name	State	Service on Committee
Smith, Margaret Chase	Maine	August 24, 1958– January 2, 1973
Smith, Ralph T	Illinois	September 18, 1969– November 3, 1970
Stennis, John	Mississippi	January 14, 1959–
Stevenson, Adlai E	Illinois	November 17, 1970– January 28, 1971
Symington, Stuart [3]	Missouri	August 24, 1958– January 3, 1977
	T	
Tydings, Joseph D.[1]	Maryland	January 8, 1965– January 14, 1966
	W	
Weicker, Lowell P., Jr	Connecticut	January 29, 1971– January 14, 1975
Wiley, Alexander [3] [4]	Wisconsin	August 24, 1958– January 8, 1963
	Y	
Young, Stephen M	Ohio	January 14, 1959– January 2, 1971

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[1] Resigned from the Committee.
[2] Became Chairman, February 25, 1963.
[3] Also a member of the Special Committee on Space and Astronautics.
[4] Left the Senate.
[5] November 26, 1961, deceased.
[6] Resigned on January 20, 1959, to take another appointment; reassigned on January 13, 1961.
[7] Also Chairman of the Special Committee.
[8] Became Vice President of the United States.
[9] Appointed Chairman on January 10, 1961.
[10] January 1, 1963, deceased.
[11] Member of Special Committee only.
[12] Acting Chairman from January 1, 1963, until February 25, 1963, between death of Senator Kerr and Senator Anderson's appointment as Chairman.

4. SPECIAL COMMITTEE ASSIGNMENTS

Ex Officio members to Appropriations Committee

86th Congress

Senators Anderson, Kerr, and Martin.

87th Congress

Senators Kerr, Anderson, and Case of New Jersey. (Senator Case was replaced by Senator Capehart as of July 27, 1962.)

88th Congress

Senators Anderson, Symington, and Hickenlooper.

89th Congress

Senators Anderson, Symington, and Hickenlooper.

90th Congress

Senators Anderson, Symington, and Hickenlooper.

91st Congress

Senators Anderson, Symington, and Curtis.

92d Congress

Senators Anderson, Symington, and Curtis.

93d Congress

Senators Moss, Symington, and Goldwater.

94th Congress

Senators Moss, Symington, and Goldwater.

5. COMMITTEE STAFF

(a) Staff Directors

Name	*Term of Service*
BeLieu, Kenneth E.	January 1, 1959, to February 5, 1961
Smith, Everard H., Jr.	February 15, 1961, to March 26, 1963
DeLuzio, Frank C.	March 27, 1963, to January 19, 1965
Gehrig, James J.	January 20, 1965, to January 21, 1973
Allnutt, Robert F.	January 22, 1973, to January 14, 1975
Keyes, Gilbert W.	January 15, 1975, to present

(b) Chief Clerks

Name	*Term of Service*
Wilson, Dr. Glen P.	January 1, 1959, to March 15, 1961
Bradley, Carter	March 15, 1961, to January 31, 1963
DuLuzio, Frank C.	March 27, 1965, to January 11, 1973
Gehrig, James J.	March 1, 1965, to January 11, 1973
Due, Mary Jane	January 12, 1973, to November 30, 1973
Allnutt, Robert F.	December 1, 1973, to June 16, 1974
Peterson, Craig M.	June 16, 1974, to present

(c) Assistant Chief Clerks

Name	*Term of Service*
Lindvelt, Dr. Earl W.	February 2 1959, to July 31, 1961
Bouchard, Sam	February 1, 1965, to May 14, 1971
Vandervort, Ralph E., Jr.	February 5, 1973, to August 14, 1974
Wood, James A.	August 15, 1974, to February 19, 1975
Matthews, Colin D.	September 1, 1975, to October 31, 1975
Platt, Joseph L.	January 5, 1976, to December 29, 1976

(d) Staff—94th Congress

Name	*Service from*
Keyes, Gilbert W., *Staff Director*	June 15, 1975, to present
Allnutt, Robert F., *Staff Director*	January 22, 1973, to June 14, 1975
Peterson, Craig M., *Chief Clerk/Counsel*	June 16, 1974, to present
Berggren, Thomas G., *Staff Assistant*	July 16, 1975, to August 31, 1975
Bruce, James T., *Professional Staff Member*	January 6, 1975, to present
Eisenhower, Earl D., *Professional Staff Member,* Minority	January 16, 1975, to present
Gehrig, James J., *Professional Staff Member*	June 1, 1964, to present
Lombard, Charles F., *Minority Counsel*	May 2, 1971, to present
Matthews, Colin D., *Assistant Chief Clerk*	September 1, 1975, to October 31, 1975
Platt, Joseph L., *Assistant Chief Clerk*	January 5, 1976, to December 29, 1976
Roberts, Thomas, *Professional Staff Member*	May 7, 1975, to September 7, 1975
Shumann, William A., *Professional Staff Member*	October 14, 1975, to present
Staub, Jerry, *Professional Staff Member*	October 31, 1973, to January 24, 1975
Vandervort, Ralph E., *Assistant Chief Clerk*	February 5, 1973, to July 15, 1975
Voorhees, Craig, *Professional Staff Member*	March 2, 1964, to present
Wilson, Glen P., *Professional Staff Member*	March 27, 1958, to present
Wood, James A., *Assistant Chief Clerk*	August 15, 1974, to February 19, 1975
Galloway, Eilene, *Special Consultant*	March 10, 1958, to present
Haun, Dave H., *Staff Assistant*	October 28, 1975, to present
Pierce, LeRoy N., *Staff Assistant*	March 16, 1976, to present

Brooks, Polly A., *Clerical Assistant*	March 18, 1974, to present
Bruno, Rhea, *Clerical Assistant*	March 7, 1960, to present
Fay, Mary Ann, *Clerical Assistant*	January 3, 1975, to present
Gunnell, Mary J., *Clerical Assistant*	June 16, 1975, to present
Jones, Ann Tracy, *Clerical Assistant*	January 10, 1973, to January 20, 1975
Risher, Karen J., *Clerical Assistant*	October 24, 1975, to present
Robbins, Mary Rita, *Clerical Assistant*	January 1, 1959, to April 30, 1975
Robinson, Patricia, *Clerical Assistant*	July 1, 1963, to present
Smith, Karen, *Clerical Assistant*	January 20, 1975, to October 9, 1975

(e) Former Staff Members

Name	*Term of Service*
Allnutt, Robert F.	January 22, 1973, to June 14, 1975
Berggren, Thomas G.	July 16, 1975, to August 31, 1975
Bouchard, Sam	February 1, 1965, to March 14, 1971
Busby, Horace	December 12, 1958, to January 31, 1959
Deachman, William J.	February 1, 1960, to July 15, 1966
Due, Mary Jane	January 2, 1973, to November 30, 1973
Fettig, Lester	February 18, 1973, to September 14, 1973
Hammon, Allen	June 13, 1966, to August 30, 1966
Lehrer, Max	January 26, 1959, to January 22, 1961
MacQuivey, Donald	September 18, 1961, to January 31, 1962
Mason, Janie E.	April 1, 1958 to June 30, 1958 and November 4, 1958, to February 1, 1959
McPherson, Harry	April 16, 1959, to December 31, 1959
Parker, William	October 17, 1966, to May 1, 1971
Resnick, Robert	March 24, 1964, to November 31, 1965
Reynolds, William A.	January 24, 1961, to February 19, 1963
Smith, Everard H., Jr.	January 8, 1959 to December 31, 1971
Staub, Jerry	October 31, 1973, to January 24, 1975
Stewart, Homer Joe	May 8, 1958, to January 31, 1959
Tufts, Colonel Harry N.	June 14, 1963, to June 25, 1965
Vance, Cyrus	May 5, 1958, to December 31, 1960
Vandervort, Ralph E.	February 5, 1973, to July 15, 1975
Weisl, Edwin L.	May 5, 1958, to December 31, 1960
Wolfe, Richard R.	September 25, 1961, to April 15, 1963

Those who served on the committee or special committee staff in a clerical capacity were:

Name	
Ake, Annette H.	August 17, 1966, to September 15, 1966
Backus, Claudia	April 16, 1962, to January 15, 1963
Brown, Jean	January 26, 1959, to February 24, 1961
D'Amico, Dorothy	January 9, 1962, to January 31, 1963
Griffin, Mary A.	June 8, 1961, to August 31, 1961
Hamblen, Ruby S.	June 15, 1964, to January 2, 1973
Jerome, Betty Lou	September 15, 1961, to November 30, 1961
Jones, Ann Tracy	January 10, 1973, to January 20, 1975
Kalland, Anne	April 9, 1973, to December 31, 1974
Keeney, Kathryn	January 16, 1959, to January 15, 1960
Kneile, Geneva	January 23, 1967, to February 10, 1969
Linden, Robert K.	February 17, 1961, to October 11, 1961 and August 21, 1962 to April 30, 1963
McAlister, Jo	September 5, 1961, to July 26, 1963
Mixon, III, A. Malachi	June 20, 1961 to July 21, 1961
Quintana, Marlou	May 8, 1964, to February 28, 1965
Robbins, Mary Rita	January 1, 1959, to April 30, 1975
Schumm, Ruth F.	May 11, 1960, to September 30, 1961
Selk, Leonore M.	June 15, 1964, to August 31, 1964
Sheridan, Christine M.	April 2, 1973, to November 18, 1973
Skillern, Zell	February 10, 1961, to May 15, 1964
Smith, Karen	January 20, 1975, to October 9, 1975
Stern, Peggy A.	November 19 ,1973, to March 15, 1974
Vater, Margaret	January 4, 1962, to April 15, 1962
Wilson, Carol	January 1, 1962, to July 15, 1966 and February 11, 1969, to January 31, 1971
Wilson, Marie D.	January 10, 1959, to May 9, 1960

6. NOMINATIONS REFERRED TO COMMITTEE

Date of hearing	Name and position	Committee action	Date confirmed by Senate
August 14, 1958	T. Keith Glennan, of Cleveland, Ohio, to be Administrator, National Aeronautics and Space Administration.	Reported favorably, August 14, 1958	August 15, 1958.
August 14, 1958	Dr. Hugh L. Dryden, Director of NACA, to be Deputy Administrator, National Aeronautics and Space Administration.	Reported favorably, August 14, 1958	August 15, 1958.
May 19, 1959	William A. M. Burden to be a member of the National Aeronautics and Space Council.	Reported favorably, May 20, 1959	May 20, 1959.
May 19, 1959	Dr. John T. Rettaliata to be a member of the National Aeronautics and Space Council.	Reported favorably, May 20, 1959	May 20, 1959.
February 2, 1961	James E. Webb to be Administrator of the National Aeronautics and Space Administration.	Reported favorably February 9, 1961	February 9, 1961.
March 23, 1961	Dr. Edward C. Welsh to be Executive Secretary of the National Aeronautics and Space Council.	Reported favorably, March 24, 1961	March 24, 1691.
March 19, 1963	The following names to be appointed Incorporators of the Communications Satellite Corporation: Joseph V. Charyk, John T. Connor, George Feldman, Beardsley Graham, Sam Harris, Edgar F. Kaiser, David M. Kennedy, George L. Killion, A. Byrne Litschgi, Leonard Marks, Bruce Sundlun, Sidney J. Weinberg, Leo D. Welch, and Leonard Woodcock.	Reported favorably, March 19, 1963	April 25, 1963.

January 28, 1966	Dr. Robert C. Seamans, Jr., to be Deputy Administrator of the National Aeronautics and Space Administration.	Reported favorably, January 28, 1966	January 29, 1966.
February 6, 1968	Dr. Thomas O. Paine to be Deputy Administrator of the National Aeronautics and Space Administration.	Reported favorably, February 6, 1968	February 7, 1968.
March 14, 1969	Dr. Thomas O. Paine, of California, to be Administrator of the National Aeronautics and Space Administration.	Reported favorably, March 14, 1969	March 20, 1969.
June 18, 1969	William A. Anders, of California, to be Executive Secretary of the National Aeronautics and Space Council.	Reported favorably, June 18, 1969	June 19, 1969.
November 25, 1969	George M. Low, of Texas, to be Deputy Administrator of the National Aeronautics and Space Administration.	Reported favorably, November 25, 1969.	November 26, 1969.
March 10, 1971	Dr. James C. Fletcher, to be Administrator of the National Aeronautics and Space Administration.	Reported favorably, March 10, 1971	March 11, 1971.
June 25, 1976	Dr. Alan M. Lovelace to be Deputy Administrator of the National Aeronautics and Space Administration.	Reported favorably, June 25, 1976	June 25, 1976.
July 21, 1976	Dr. H. Guyford Stever, to be Director, Office of Science and Technology Policy, Executive Office of the President.	Reported favorably, July 28, 1976	August 9, 1976.

7. PUBLICATIONS

1958

(a) Special Committee on Space and Astronautics

HEARINGS

Hearings on S. 3609, a bill to provide for research into problems of flight within and outside the Earth's atmosphere, and for other purposes. Part 1, May 6, 7, 8, 1958. Part 2, May 13, 14, 15, 1958.*

Hearing on the nomination of T. Keith Glennan to be Administrator, NASA, and the nomination of Dr. Hugh L. Dryden to be Deputy Administrator, NASA, August 14, 1958.*

REPORTS

Senate Report No. 1701 to accompany S. 3609, National Aeronautics and Space Act of 1958, June 11, 1958.*

Senate Report No. 2042 to accompany H.R. 11805, construction of aeronautical research facilities by the National Advisory Committee for Aeronautics, July 30, 1958.*

Senate Report No. 2076, construction of aeronautical and space research facilities by the National Aeronautics and Space Administration, July 31, 1958.*

Senate Report No. 100, final report of the Special Committee on Space and Astronautics, March 11, 1959.*

COMMITTEE PRINTS

Compilation of Materials on Space and Astronautics, No. 1, March 27, 1958.* Edited by Eilene Galloway and Dr. Glen P. Wilson.*

Compilation of Materials on Space and Astronautics, No. 2, April 14, 1958.* Edited by Eileen Galloway and Dr. Glen P. Wilson.*

Space Law, A Symposium, prepared by Eilene Galloway, special consultant to the Special Committee on Space and Astronautics, December 31, 1958*

1959

(b) Committee on Aeronautical and Space Sciences

HEARINGS

Hearings before the NASA Authorization Subcommittee on S. 1096, the NASA supplemental authorization for fiscal year 1959, February 19 and 20, 1959.*

Hearing before the NASA Authorization Subcommittee on H.R. 4913, an amendment to the National Aeronautics and Space Act of 1958, April 7, 1959.*

Hearings before the NASA Authorization Subcommittee on S. 1582, a bill to authorize appropriations to the National Aeronautics and Space Administration for salaries and expenses, research and development, construction and equipment, and for other purposes. Part I—

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*No longer available.

Scientific and Technical Presentations, April 7, 8, 9, 10, 1959. Part II—Program Detail for fiscal year 1960, May 21, 1959.*

Joint hearings before the Preparedness Investigating Subcommittee of the Committee on Armed Services and the Committee on Aeronautical and Space Sciences on Missile and Space Activities, January 29 and 30, 1959.*

Hearings before the Subcommittee on Governmental Organization for Space Activities on Investigation of Governmental Organization for Space Activities, March 16, 24, and April 14, 15, 22, 24, 29 and May 7, 1959.*

Hearings on the nominations of William A. M. Burden and Dr. John T. Rettaliata to be members of the National Aeronautics and Space Council, May 19, 1959.*

REPORTS

Senate Report No. 82 to accompany S. 1096, NASA supplemental authorization for fiscal year 1959, March 5, 1959.*

Senate Report No. 213 to accompany H.R. 4913, amendment to the National Aeronautics and Space Act of 1958, April 20, 1959.*

Senate Report No. 332 to accompany S. 1592 (H.R. 7007) a bill to authorize appropriations to the National Aeronautics and Space Administration, June 2, 1959.*

Senate Report No. 806 on Governmental Organization for Space Activities, August 25, 1959.*

Senate Report No. 1014 on Project Mercury: Man-In-Space Program of the National Aeronautics and Space Administration, prepared by Dr. Earl W. Lindveit, December 1, 1959.*

1960

HEARINGS

Joint hearings before the Preparedness Investigating Subcommittee of the Committee on Armed Services and the Committee on Aeronautical and Space Sciences on Missiles, Space, and Other Major Defense Matters, February 2, 3, 4, 8, 9, and March 16, 1960.*

Hearings on House Joint Resolution 567, transfer of Von Braun team to NASA, February 18, 1960.*

Hearings before the NASA Authorization Subcommittee on H.R. 10809, NASA authorization for fiscal year 1961. Part 1, Program Detail for Fiscal Year 1961, March 28, 29, and 30, 1960. Part II, Scientific and Technical Aspects of NASA Program, June 30, 1960.*

REPORTS

Senate Report No. 1142 to accompany House Joint Resolution 567, transfer of Von Braun team to NASA, February 26, 1960.*

Senate Report No. 1300 to accompany H.R. 10809, NASA authorization for fiscal year 1961, April 29, 1960.*

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COMMITTEE PRINTS

Space Research in the Life Sciences: An Inventory of Related Programs. Resources, and Facilities, prepared by Dr. Earl W. Lindveit, July 15, 1960.*

Radio Frequency Control in Space Telecommunications prepared by Dr. Edward Wenk, Jr., Senior Specialist in Science and Technology, Legislative Reference Service, Library of Congress, March 19, 1960.*

Policy Planning for Space Telecommunications. Staff report. December 4, 1960.*

Senate Document No. 26, Legal Problems of Space Exploration: A Symposium, by Mrs. Eilene Galloway, special consultant to the committee, March 22, 1961.*

1961

HEARINGS

Hearing on the nomination of James Edwin Webb to be Administrator of the National Aeronautics and Space Administration, February 2, 1961.*

Hearing on the nomination of Edward Christy Welsh to be Executive Secretary of the National Aeronautics and Space Council, March 23, 1961.*

Hearings on the National Aeronautics and Space Administration scientific and technical programs, February 28 and March 1, 1961.*

Hearing on H.R. 6169, amending the National Aeronautics and Space Act of 1958, April 19, 1961.*

Hearings on S. 1857, amending various sections of the National Aeronautics and Space Administration Act of 1958, May 16 and June 2, 1961.*

Hearings on H.R. 6874, a bill to authorize appropriations to the National Aeronautics and Space Administration for fiscal year 1961, June 7, 8, and 12, 1961.*

Hearings on S. 2481, amending the National Aeronautics and Space Administration Authorization Act for the fiscal year 1962.*

REPORTS

Senate Report No. 174 on H.R. 6169, amending the National Aeronautics and Space Act of 1958, April 19, 1961.*

Senate Report No. 475 on H.R. 6874, a bill to authorize appropriations to the National Aeronautics and Space Administration for fiscal year 1962, June 27, 1961.*

Senate Report No. 863 on S. 2481, amending the National Aeronautics and Space Administration Authorization Act for the fiscal year 1962, September 1, 1961.

COMMITTEE PRINTS

Staff report, National Aeronautics and Space Act of 1958 as amended through October 6, 1961.*

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1962

HEARINGS

Hearing on Orbital Flight of John H. Glenn, Jr. (also printed as S. Doc. 79) February 28, 1962.*

Hearings on S. 2650, a bill to amend the National Aeronautics and Space Act of 1958, as amended, with respect to space communications facilities, and for other purposes, and S. 2814, a bill to provide for the establishment, ownership, operation, and regulation of a commercial communications satellite system, and for other purposes, February 27, 28 and March 1, 5, 6, and 7, 1962.*

Hearings on H.R. 11737, NASA authorization for fiscal year 1963, June 13, 14, and 15, 1962.*

REPORTS

Senate Report No. 1319 to accompany S. 2814, the Communications Satellite Act of 1962, February 27 and 28 and March 1, 5, 6, and 7.*

Senate Report No. 1633 to accompany H.R. 11737, NASA authorization for fiscal year 1963, June 27, 1962.*

COMMITTEE PRINTS

Staff report, Communications Satellites: Technical, Economic, and International Developments, February 25, 1962.*

Staff report, Meteorological Satellites, March 29, 1962.*

Staff report, Soviet Space Programs: Organization, Plans, Goals, and International Implications, May 31, 1962.*

Staff report, Manned Space Flight Program of the National Aeronautics and Space Administration: Projects Mercury, Gemini, and Apollo, September 4, 1962.*

Staff report, National Aeronautics and Space Act of 1958 as amended through the end of the 87th Congress, October 13, 1962.*

1963

HEARINGS

Hearings on Nominations of Incorporators for the Communications Satellite Corporation, March 19, 1963.*

Hearings on Scientific and Technical Aspects of NASA Authorization for fiscal year 1964. Part 1, April 24, 25, 26, 29, and 30, 1963.*

Hearings, Testimony of Scientists on Goals of the Nation's Space Program, June 10 and 11, 1963.*

Hearings on Program Detail for NASA Authorization for fiscal year 1964. Part 2, June 12, 13, 17, and 18, 1963.*

Hearings on Educational Programs of NASA, November 21 and 22, 1963.*

REPORTS

Senate Report 385, NASA authorization for fiscal year 1964 to accompany H.R. 7500 (S. 1245), August 2, 1963.*

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COMMITTEE PRINTS AND SENATE DOCUMENTS

Senate Document No. 18, Documents on International Aspects of the Exploration and Use of Outer Space, 1954–62, May 9, 1963.

Senate Document No. 42, U.S. Astronauts, November 15, 1963.*

1964

HEARINGS

Hearings on S. 2446, Scientific and Technical Programs of NASA Authorization for Fiscal Year 1965. Part I, March 4, 1964.*

Hearings on S. 2446, Program Detail for NASA Authorization for Fiscal Year 1965. Part II, March 4, 5, 6, 9, 16, 17, and 18, 1964.*

REPORTS

Senate Report No. 1054 to accompany H.R. 10456, NASA Authorization for Fiscal Year 1965.*

COMMITTEE PRINTS

Reports on Electronic Research Center, National Aeronautics and Space Administration, January 31, 1964.*

1965

HEARINGS

Hearings on Space Launch Vehicles, January 26 and 27, 1965.*

Hearings, Scientific and Technical Programs and Program Management of NASA Authorization for Fiscal Year 1966. Part 1, March 8, 9, 10, 11, 12, and 15, 1965.*

Hearings, Program Budget Detail for NASA Authorization for Fiscal Year 1966. Part 2, March 22, 23, 24, 25, and 30, 1965.*

Hearings (Appendixes) Post-Apollo Planning Documents and Information Relating to Fiscal Year 1966 Authorization of NASA. Part 3.*

Hearings, National Space Goals for the Post-Apollo Period, August 23, 24, and 25, 1965.*

REPORTS

Senate Report No. 188, to accompany H.R. 7717 (S. 927), NASA Authorization for Fiscal Year 1966, May 13, 1965.*

COMMITTEE PRINTS AND SENATE DOCUMENTS

Senate Document No. 44, U.S. International Space Programs—1959–65. Edited by Eilene Galloway.

Senate Document No. 56, International Cooperation and Organization for Outer Space, by Eilene Galloway.

National Aeronautics and Space Act of 1958 as amended through the end of the 89th Congress, first session, December 31, 1965.*

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1966

HEARINGS

Hearings, National Communications Satellite Programs, January 25 and January 26, 1966.*

Hearing on the nomination of Dr. Robert C. Seamans, Jr., to be Deputy Administrator of the National Aeronautics and Space Administration, January 28, 1966.*

Hearing, Manned Orbiting Laboratory, February 24, 1966.*

Hearings on S. 2909, NASA Authorization for Fiscal Year 1967, February 28, March 1, 2, 3, and 4, 1966.*

REPORTS

Senate Report No. 1184, to accompany H.R. 14324, NASA Authorization for Fiscal Year 1967, May 23, 1966.*

COMMITTEE PRINTS AND SENATE DOCUMENTS

Senate Document No. 90, "Policy Planning for Aeronautical Research and Development," May 1966.*

"Space Treaty Proposals by the United States and U.S.S.R.," by Eilene Galloway, July 1966.*

1967

HEARINGS

Hearings, Aeronautical Research and Development Policy, January 25, 26, and February 27, 1967.

Hearings, Apollo Accident, Part 1, February 7, 1967.

Hearings, Apollo Accident, Part 2, February 27, 1967.

Hearings, Apollo Accident, Part 3, April 11, 1967.

Hearings Apollo Accident, Part 4, April 13 and 17, 1967.

Hearings, S. 1296, NASA Authorization for Fiscal Year 1968, Part 1, April 18, 19, and 20, 1967.

Hearings, S. 1296, NASA Authorization for Fiscal Year 1968, Part 2, April 21, 25, 26, and 27, 1967.

Hearings, Apollo Accident, Part 5, May 4, 1967.

Hearings Apollo Accident, Part 6, May 9, 1967.

Hearings, Apollo Accident, Part 7.

Hearings, NASA's Proposed Operating Plan for Fiscal Year 1968, November 8, 1967.

REPORTS

Senate Report No. 353, to accompany S. 1296, NASA Authorization for Fiscal Year 1968, June 23, 1967.*

COMMITTEE PRINTS

Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Analysis and Background Data, by Eilene Galloway, March 1967.*

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*No longer available.

1968

HEARINGS

Hearing, Apollo Accident, Part 8, January, 1968.*

Hearing, Nomination of Dr. Thomas O. Paine to be Deputy Administrator of the National Aeronautical and Space Administration.*

Hearings, S. 2918, NASA Authorization for Fiscal Year 1969, Part I, February 27, 28 and 29, 1968.*

Hearings, S. 2918, NASA Authorization for Fiscal Year 1969, Part II, March 5, 19 and 26, and April 23, 1968.*

Hearing, Apollo 6 Mission, April 22, 1968.*

Hearings, S. 2918, NASA Authorization for Fiscal Year 1969, Part III, April 24, 25, and 30, 1968.*

Hearings, NASA's Proposed Operating Plan For Fiscal Year 1969 October 3, 1968.*

REPORTS

Senate Report No. 956, Apollo 204 Accident, January 30, 1968.*

Senate Report No. 957. Aeronautical Research and Development Policy, January 30, 1968.*

Senate Report No. 1136, to accompany H.R. 15856 (S. 2918) NASA Authorization for Fiscal Year 1969, May 21, 1968.*

COMMITTEE PRINT AND SENATE DOCUMENTS

Agreement on the Rescue of Astronauts, The Return of Astronauts and The Return of Objects Launched Into Outer Space—Analysis and Background Data, by Eilene Galloway, July 16, 1968.*

Committee on Aeronautical and Space Sciences, United States Senate Tenth Anniversary, 1958–68, Senate Document No. 116.*

National Aeronautics and Space Act of 1958, as amended, through the end of the 90th Congress, December 1968.*

1969

HEARINGS

Hearing, Nomination of Dr. Thomas O. Paine to be Administrator of NASA, March 14, 1969.*

Hearings, S. 1941, NASA Authorization for Fiscal Year 1970, Part I, April 28, 29, and 30, 1969.*

Hearings, S. 1941, NASA Authorization for Fiscal Year 1970, Part II, May 1, 6, and 9, 1969.*

Hearing, Nomination of William A. Anders to be Executive Secretary of the National Aeronautics and Space Council, June 18, 1969.*

Hearing, Future NASA Space Programs, August 5, 1969.*

Hearing, Nomination of George M. Low to be Deputy Administrator of NASA, November 25, 1969.*

REPORTS

Senate Report, 282 NASA Authorization for Fiscal Year 1970.*

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1970

HEARINGS

Hearing, NASA Operating Plan for Fiscal Year 1970, February 2, 1970.*

Hearings, (S. 3374), NASA Authorization for Fiscal Year 1971, Part I, February 20, 27 and March 4, 1970.*

Hearings, (S. 3374), NASA Authorization for Fiscal Year 1971, Part II, March 5, 6, and 18, 1970.*

Hearings, (S. 3374) NASA Authorization for Fiscal Year 1971 (International Space Cooperation), Part III, March 11, 1970.*

Hearings, S. Con. Res. 49, Congressional Recognition of Goddard Rocket and Space Museum, March 16, 1970.*

Hearing, Space Program Benefits, April 6, 1970.*

Hearing, Apollo 13 Mission, April 24, 1970.*

Hearing, Apollo 13 Mission Review, June 30, 1970.*

REPORTS

Senate Report No. 91–833, to accompany H.R. 16516, NASA Authorization for Fiscal Year 1971.*

1971

HEARINGS

Hearing, Nomination of Dr. James C. Fletcher to be Administrator of the National Aeronautics and Space Administration, March 10, 1971.*

Hearing, Space Cooperation Between the United States and the Soviet Union, March 17, 1971.*

Hearing, Nuclear Rocket Engine Development Program, February 23, and 24, 1971.*

Hearings, NASA Authorization for Fiscal Year 1972, Part I, March 30, and April 1, 1971.*

Hearings, NASA Authorization for Fiscal Year, 1972, Part II, April 2, and 5, 1971.*

Hearing, H.R. 11487 (S.J. Res. 42) to authorize the Administrator of the National Aeronautics and Space Administration to convey certain lands in Brevard County, Florida (Chapel of the Astronauts), December 2, 1971.*

REPORTS

Senate Report No. 92–146, to accompany H.R. 7109, NASA Authorization for Fiscal Year 1972, June 8, 1971.*

SENATE DOCUMENTS

Senate Document No. 92–40, Statements by Presidents of the United States on International Cooperation in Space—A Chronology: October 1957–August 1971.*

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Senate Document No. 92–51, Soviet Space Program 1966–1970, December 9, 1971.*

Senate Document No. 92–57, International Cooperation in Outer Space: A Symposium, December 9, 1971.*

1972

HEARINGS

Hearings, NASA Authorization for Fiscal Year 1973, Part I, March 14, 15, and 16, 1972.*

Hearings, NASA Authorization for Fiscal Year 1973, Part II, March 22, 23, April 12 and 14, 1972.*

Hearing, Space Agreements With The Soviet Union, June 23, 1972.

Hearing, (S. 2190), Use of Recycled Materials By NASA, June 27, 1972.*

REPORTS

Senate Report 779, NASA Authorization for Fiscal Year 1973.*

Senate Report 600, to accompany H.R. 11487, "Chapel of the Astronauts".*

COMMITTEE PRINTS

Staff Report, Soviet Space Programs, 1971 (A Supplement to the Corresponding Report Covering The Period 1966–70), April 1972.*

Staff Report, Convention On International Liability For Damage Caused by Space Objects, May 1972.*

The Impact of the Space Age on Education in the United States, November 1972.*

1973

HEARINGS

Hearing, S.J. Res. 37, To Designate The Manned Spacecraft Center in Houston, Texas, as the "Lyndon B. Johnson Space Center" In Honor of the Late President, February 2, 1973.*

Hearings, NASA Authorization for Fiscal Year 1974, Part I, February 28, March 6, 7, and 9, 1973.*

Hearings, NASA Authorization for Fiscal Year 1974, Part II, March 12, 14, 15, 21, and 22, 1973.*

Hearings, NASA Authorization for Fiscal Year 1974, Part III, April 3, 4, and 10, 1973.*

Hearing. Status of Skylab Mission. May 23, 1973.*

Joint Hearing, with Committee on Science and Astronautics. Testimony From Skylab Astronauts, July 17, 1973.*

Hearing, Report of Skylab I Investigation Board, July 30, 1973.*

Hearing, State of the Aerospace Industry, September 26 and 27, 1973.*

Hearing, Space Shuttle Payloads (Parts 1 and 2), October 30 and 31, 1973.

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REPORTS

Senate Report No. 93–15, on S.J. Res. 37.*

Senate Report 93–89, Report of Activities During the 92nd Congress, March 27, 1973.*

Senate Report 93–179, Report on NASA Authorization For Fiscal Year 1974.*

COMMITTEE PRINT

Toward A Better Tomorrow, March 6 and 14, 1973.

1974

HEARINGS

Hearing, NASA's Equal Employment Opportunity Program, January 24, 1974.*

Hearing, S. 2658, Solar Heating and Cooling, February 25, 1974.*

Hearings, S. 2955, NASA Authorization for Fiscal Year 1975, Part I, February 5, 26, and 28, 1974.

Hearings, S. 2955, NASA Authorization for Fiscal Year 1975, Part II, March 13 and 20, 1974.

Hearings, S. 2955, NASA Authorization for Fiscal Year 1975, Part III, April 2 and 4, 1974.

Hearings, S. 2955, NASA Authorization for Fiscal Year 1975, Index, Part IV.

Hearing, S. 2495, Technology Resources Survey and Applications Act, March 11 and 21, 1974.

Joint Hearing with Committee on Commerce, Science and Technology Applications Act of 1974, July 11, 1974.*

Hearing, Advanced Aeronautical Concepts, July 16 and 18, 1974.*

Hearing, S. 3542, Seventh Applications Technology Satellite (ATS–7), July 23, 1974.

Hearings, S. 2350 and S. 3484, Earth Resources Satellites, August 6, 8, and 9, and September 18, 1974.*

1975

HEARINGS

Hearing, Planetary Science and the Earth's Upper Atmosphere, January 29, 1975.*

Hearings, (S. 573), NASA Authorization for Fiscal Year 1976, Part I, March 3, 11, and 13, 1975.

Hearings, (S. 573), NASA Authorization for Fiscal Year 1976, Part II, March 18 and 19, 1975.

Hearings, (S. 573), NASA Authorization for Fiscal Year 1976, Part III, March 3 and 11, 1975.

Hearings, (S. 573), NASA Authorization for Fiscal Year 1976, Part IV.

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Hearing, Earthquake Research and Knowledge, April 26, 1975.*

Hearings, Stratospheric Ozone Depletion, Part I, Sept. 8, 9, 15, and 17, 1975.

Hearings, Stratospheric Ozone Depletion, Part II, Sept. 18, 19 and 23, 1975.

Hearings, NASA's Fuel Efficient Program, Sept. 10, October 23, and November 4, 1975.

Hearings, Technology Utilization, September 22, 23, and 24, 1975.

Hearings, Presidential Science Adviser, Joint Hearings held October 28, November 4, and November 12, 1975.

REPORTS

Senate Report No. 94–49, Report of Activities During the 93rd Congress.*

Senate Report No. 94–103, on H.R. 4700, NASA Authorization for Fiscal Year 1976.

COMMITTEE PRINTS

National Aeronautics and Space Act of 1958, as amended, and related legislation, March 1975.

Energy Related Research and Development, April 1975.

Convention on Registration of Objects Launched into Outer Space: Analysis and Background Data, July 1975.

The International Legal and Institutional Aspects of the Stratospheric Ozone Problem, August 1975.

1976

HEARINGS

Hearings, Solar Power from Satellites, January 19 and 21.

Hearings, Fiscal Year 1977 Authorization for the National Aeronautics and Space Administration (S. 2864), Part 1, Budget Detail; Part 2, Hearings on January 26 and 27, February 3 and 5; Part 3; Hearings on February 17 and 24 and March 3; Part 4, Index.

Hearings, Stratospheric Ozone and Its Effects, February 25 and March 1.

Hearing, Medical and Biological Research in Space, April 2.

Hearing, Space Processing, June 17.

Hearing, Nomination of Dr. Alan M. Lovelace, June 25.

Hearing, Nomination of Dr. H. Guyford Stever, July 28.

Hearings, Alternative Fuels for Aviation, September 27 and 28.

Hearing, Chlorofluorocarbon Effects and Regulations, December 15, 1976.

REPORTS

Senate Report 94–633, Aircraft Fuel Efficiency Program.

Senate Report 94–718, NASA Authorization for FY 1977, H.R. 12453.

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Production of Aviation Jet Fuel from Coal, June 1.

An Analysis of the Future Landsat Effort, August 10.

Soviet Space Programs, 1971–75, Volumes 1 and 2, August 30.

Committee on Aeronautical and Space Sciences, 1958–1976, December 30, 1976.

Space Law, Selected Basic Documents, December 30, 1976.

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